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SOME FACTS ABOUT CANCER

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A conviction has been steadily growing in us at the Tata Memorial Hospital that a general practitioner should know more about cancer, if he is to save his patients from much suffering. This conviction is based on a study of the first 10,000 patients who have been examined by us during the last five years, and a systematic examination of the available literature.

It might be argued that cancer is matter for specialists and the consulting doctors. This is not true. It is the general practitioner who sees the incipient and early stages of the disease. The progress of the patient depends mainly on the correct handling and advice given by the family doctor. He is also the person who sees the patients in their terminal struggle and draws together the eyelids in the presence of the bereaved relatives.

The facts about cancer are many and varied; and it would be unprofitable even to attempt to enumerate them here. I shall therefore restrict myself to a few general observations and illustrate them by a brief consideration of three types of cancer commonly seen by us.

The general observations I would like to make are these:

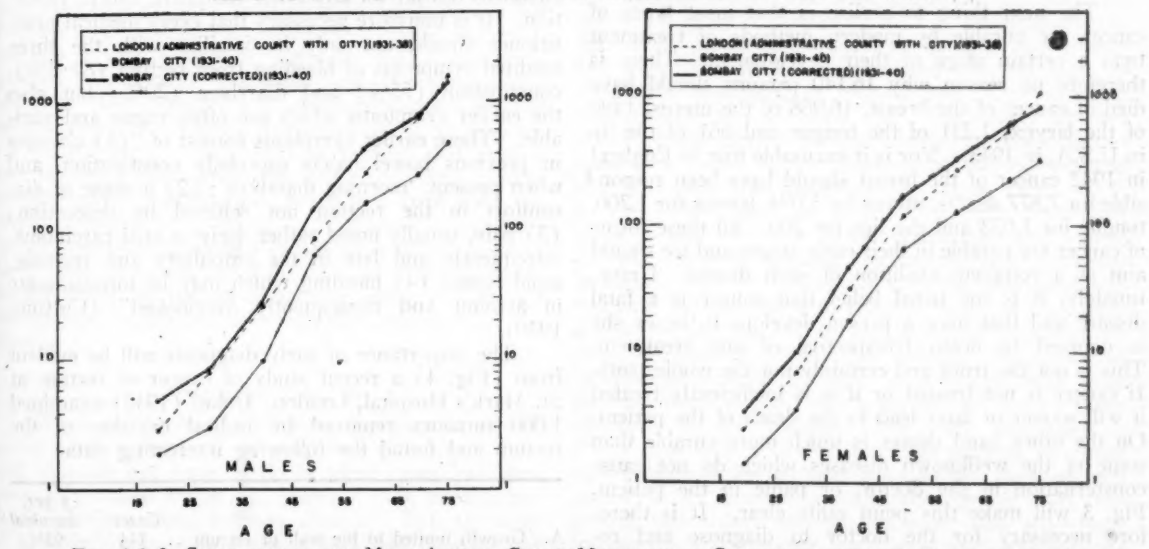
1. Cancer is as common among us as in the people of western countries.
2. Many types of cancer are curable.
3. The time for administering curative treatment to cancer patients is in the early stages of disease, palliation is all that could be offered at a later stage.

These remarks may appear so obvious that the necessity for stating them may be wondered at. Our experience of last six years has shown that the obvious is not necessarily the evident. I shall therefore deal with these points briefly.

PREVALENCE

As regards the prevalence of cancer in India many people have erroneous ideas. It has been determined that between 100 to 150 persons die every year of cancer per 100,000 persons, living in countries where there are adequate facilities for diagnosis of malignant diseases. An intensive study of small areas has further shown that the number of cancer cases is roughly

MEAN ANNUAL CANCER MORTALITY PER 100,000 LIVING AT EACH AGE GROUP



FIGS. 1 & 2—SHOWING THAT THE MEAN ANNUAL CANCER MORTALITY AS CALCULATED FROM THE PUBLISHED DATA IS LOWER AT ALL AGE GROUPS IN BOMBAY AS COMPARED TO LONDON. AFTER CORRECTION FOR DEATHS UNCERTIFIED BY MEDICAL MEN, THE CANCER MORTALITY IN BOMBAY CITY IS SEEN TO BE THE SAME IF NOT A LITTLE HIGHER THAN THAT OBTAINED IN LONDON.

five times the number of deaths attributed to cancer in any given population. In U.S.A. for instance, cancer stands as the second most important cause of death, and about 1½ lac persons die annually from it. In India on the same basis there should be about 4½ lac deaths from cancer every year, and about 20 lac cancer cases at any one time. The actual deaths and cases are likely to be fewer because of the shorter average length of life in Indians and the overwhelming number of many avoidable and infectious diseases. Even a reasonably approximate estimate regarding the incidence of cancer in India cannot be made from the official statistics. Our own investigations (Khanolkar, 1945*b*) based on a study of nearly 4,000 post-mortems and the published mortality figures in the city of Bombay have revealed some interesting facts. I would only refer to one of them. The cancer death rate in the city after correction for the deaths uncertified by medical practitioners, closely approximates the death rates in London and New York (Figs. 1 and 2). It appears that the incidence of cancer in India and U.K. and U.S.A. is about the same if it is correlated with the age composition of the population in the three countries. The difference lies mainly and markedly in the distribution of cancer in various parts of the body in the different races or groups of people. Thus for instance oral cancer is a very important problem with us at present, whereas cancer of the stomach looms as the largest menace for the Europeans. Cancer of the penis is commonly met with in Hindus, very rare in Muslims and almost unheard of in Jews. Cancers of breast and uterus were about equally numerous in English women, whereas in the Japanese the uterine cancer was about twice as common and the breast cancer only 1/3 as frequent as in the White American women.

Types of Curable Cancer

The next thing to realise is that most types of cancer are curable by modern methods of treatment upto a certain stage of their development. There is therefore no reason why 16,140 persons should have died of cancer of the breast, 16,968 of the uterus, 1490 of the larynx, 1,231 of the tongue and 661 of the lip in U.S.A. in 1943. Nor is it excusable that in England in 1942 cancer of the breast should have been responsible for 7,877 deaths, uterus for 5,094, larynx for 1,206, tongue for 1,033 and the lips for 290. All these forms of cancer are curable in their early stages and we should aim at a complete abolition of such deaths. Unfortunately, it is the usual belief that cancer is a fatal disease and that once a person develops it, he or she is doomed to death irrespective of any treatment. This is not the truth and certainly not the whole truth. If cancer is not treated or if it is inefficiently treated it will sooner or later lead to the death of the patient. On the other hand cancer is much more curable than some of the wellknown diseases which do not cause consternation in the doctor, or panic in the patient. Fig. 3 will make this point quite clear. It is therefore necessary for the doctor to diagnose and reassure his patient and it is essential for the patient to follow the treatment suggested to him with fortitude and with courage. The difficulty lies in the creation of a cancer consciousness in the lay public and a better acquaintance with early cancer in the medical practitioner. Most of the older teachers and text

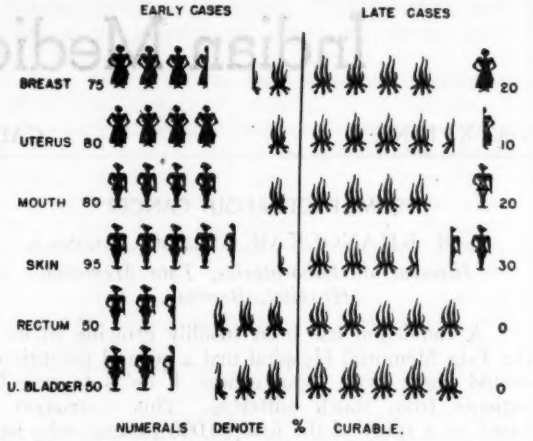


Fig. 3—Each Male or Female Figure Represents 20% of Cancer Cases Who Survived Five Years after Adequate Treatment. The Fire Represents 20% of Cases Who Died from that Cancer Within the Same Period.

books talk about the so-called pathognomonic features of cancer which are really evidences of far advanced disease. I will attempt to make my meaning clear by a couple of not uncommon examples.

The standard text book symptoms of rectal cancer are mentioned as anaemia, "ribbon stools" and the symptom complex characteristic of low intestinal obstruction. These are usually seen in the terminal stages of the disease. If cancer is diagnosed on the basis of these symptoms the disease has probably advanced too far for any other treatment except palliation. It is therefore necessary that every medical practitioner should not only be familiar with the three cardinal symptoms of bleeding from rectum (89·5%), constipation (55%) and diarrhœa (20%) but also the earlier symptoms which are often vague and variable. These earlier symptoms consist of "(1) changes in previous bowel habits especially constipation, and when present, 'morning diarrhœa'; (2) a sense of discomfort in the rectum not relieved by defecation; (3) pain, usually noted rather early in anal carcinoma, infrequently and late in the ampullary and rectosigmoid types; (4) bleeding which may be inconsiderate in amount and consequently overlooked" (Cutting, 1930).

The importance of early diagnosis will be evident from (Fig. 4) a recent study of cancer of rectum at St. Mark's Hospital, London. Dukes (1945) examined 1,000 tumours removed by radical excision of the rectum and found the following interesting data:

	Cases	*5 yrs. survival*
A. Growth limited to the wall of rectum ..	144	93%
B. Extension to extrarectal tissue but no lymph node involvement	342	65%
C. Metastasis in regional lymph nodes ..	499	23%

Let me take another example which is our despair at the present moment. Cancer of the œsophagus is unfortunately not rare in our patients. In the first 5,000 patients who attended the Tata Memorial Hospital there were 153 cases of carcinoma of the œsophagus. Borges (1944) and Jussawalla (unpublished data) have described our experience of these tumours, with surgery and with radiation. It appears that a faint glimmer of hope lies in a treatment of properly selected early cases. And yet we find that the patient is repeatedly advised to try medical treatment first and to seek treatment in a cancer clinic only when other methods fail. An interesting observation in some of our patients deserves brief mention. It was noticed that some patients with early disease felt better every time they changed their doctor and commenced a new treatment, although the disease progressed relentlessly. MacVicar and others have also observed that patients with stomach cancer respond satisfactorily to medicinal treatment for a short time. (Balfour, 1945). It should be evident that after a certain delay the weakened and emaciated patient should never entertain any hope of a cure with the methods known to us to-day. A general practitioner should therefore be always on the alert not to miss an early case of cancer; and in case of slightest doubt should direct his patient to a clinic which is equipped for an early diagnosis and effective treatment of the disease.

CANCER OF THE RECTUM
(St. Mary's Hospital London 1000 Cases)

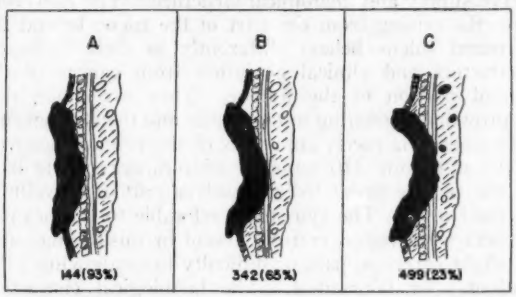


FIG. 4—RELATION OF SURVIVAL TO SPREAD OF DISEASE IN CANCER OF THE RECTUM AFTER RADICAL EXCISION. THE LYMPH NODES IN BLACK ARE MEANT TO REPRESENT THOSE WITH METASTATIC INVOLVEMENT

A—Growth limited to wall of rectum
B—Extension of growth to extra-rectal tissues
C—Metastases in regional lymph nodes

ADVANCED CANCER

What should be the attitude of a general practitioner when he sees an advanced case of cancer? The best that we can hope to do in these cases has been admirably stated by W. J. Mayo. "To cure sometimes, alleviate often, comfort always." It is the duty of a practitioner to find out what could be expected from radium and deep x-ray therapy in his particular patient before recommending it as a treatment. It is heartless to send him with an advanced cancer on long futile journeys in search of panaceas which do not exist.

CANCER IN BOMBAY

Let me now proceed to give a little more specific information derived from the study of our patients in Bombay.

I. *Cancer of the oral cavity* constitutes the largest group seen by us in Bombay. During the first 30 months we came across one thousand cases of oral cancer, out of a total 2880 cases of carcinoma. In other words, every third case of cancer was a mouth cancer. A review of these one thousand cases (Khanolkar, 1944c) revealed interesting features some of which may be worth recounting.

1. The largest group belonged to cancer of the tongue (522). There were 174 cases of cancer of the tonsil and 165 of cancer of the cheek.

2. The cancer was located in the base of the tongue and in the tonsils in over 60 per cent of the cases.

3. Cancer of the lip accounts for nearly 20 per cent of the oral cancer at the Memorial Hospital in New York and only 1·7 per cent at the Tata Memorial Hospital in Bombay. The cancer mortality figures for U.S.A. show that the high figures for this type of cancer are not due to an unusual attendance at the Memorial Hospital of those suffering from lip cancer.

4. In New York cancer of the anterior two-thirds of the tongue is twice as common as at the base, whereas in Bombay these proportions are reversed.

5. As compared to Gujaratis, cancer of the buccal mucosa is six times (5·2 against 30·8 per cent) more common among Deccanis, while that of the tongue is one and a half times as common among Gujaratis (64·3 against 42·8 per cent), the major portion of this higher incidence being in the posterior third of the tongue (Fig. 5).

Cancer of the cheek deserves further consideration because it is fairly frequently seen in Maharashtra and Karnatak. It is met with both in men and women and we believe that it is associated with the habit of chewing tobacco with or without *pan*. Our youngest patient was only 24 years old. The cancer appears as a raised uneven friable patch on the mucous membrane, which later ulcerates on the surface and infiltrates into the tissues of the cheek (Figs. 6, 7, 8, 9). This leads at first to a slight discomfort in chewing, a little raw sensation and some difficulty in fully opening the mouth. An extension backwards and an infiltration into the pterygoid and temporal muscles leads to trismus, whereas an extension to the alveolus lessens the chances of a satisfactory cure. Paymaster (1944) has recently described our experience of oral tumours in a simple and clear manner which would repay a careful perusal by those interested in this subject. We were depressed to notice that only 9 out of our 309 patients of cheek cancer came to see us with a lesion less than an inch across in its surface spread, although in 126, the growth had broken through the outer skin after infiltrating the thickness of the cheek, and 109 patients were hardly able to open the mouth. "The average time that elapsed, between the appearance of the first symptom and the patient's visit to our hospital has been calculated as 7 months. This delay has been

attributed mainly to the ignorance and indifference on the part of the patient to realise the gravity of the disease, but in some cases the private practitioners and the dentists have also been responsible for this unfortunate delay" (Paymaster and Shroff, 1946). The expectation of a satisfactory cure by radiation or operative procedures is so good in buccal cancer that no medical man should allow an early case to pass into an advanced stage, but should speedily refer his patient to a place where his disease could be properly attended to.

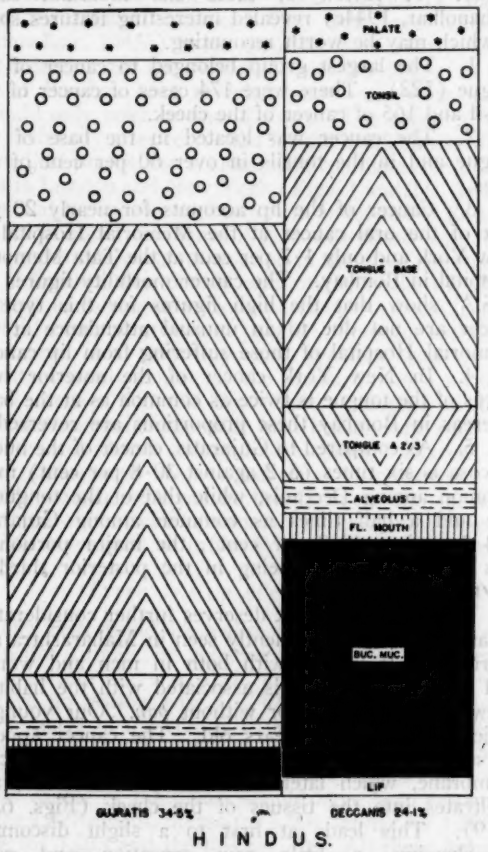


FIG. 5—RELATIVE FREQUENCY OF CANCER OF DIFFERENT PARTS OF MOUTH CAVITY, IN THE TWO MAJOR GROUPS OF HINDUS AS SEEN AT THE TATA MEMORIAL HOSPITAL, BOMBAY.

Cancer of the tongue is one of the problems which is engaging the careful attention of our staff for the past five years. We have learnt a lot about this disease which does not entirely tally with the current ideas on the subject. We submit that a medical man should never neglect any small nodularity, induration or depression on the lateral edge of the tongue in a grown up person. In its early stages it may be absolutely painless and non-tender. We have watched the development of three such cancers in persons who complained of little uneasy foreign body sensation and a slight discomfort without any clinical or microscopic evidence of cancer (Figs. 10, 11, 12, 13). A careful follow-up revealed the cancerous transformation during the course of 6-9 months. We should very strongly like to warn against waiting for a hard ulcerating growth, interfering with movements of the tongue and showing metastatic nodes in the neck before declaring the process as cancerous.

The pharyngeal portion of the tongue is different from the anterior buccal portion in its development, nerve supply and anatomical structure. The cancerous growths arising from the part of the togue behind the terminal sulcus behave differently in their biological characters and clinical evolution from cancer of the buccal portion of the tongue. They are more akin to growths originating in the tonsils and the oropharynx. The patient is rarely conscious of the primary growth. 210 out of our 310 patients with cancer of the base of the tongue presented themselves only for swellings in their neck. The symptoms referable to the original growth were vague, entirely absent or misleading, such as slight soreness, pain or difficulty in swallowing (192 patients) or hoarseness. The histological characters of these tumours are often those of an anaplastic epidermoid carcinoma. They run a more rapid course and are more radiosensitive than other tumours of the tongue. A precocious involvement of the cervical lymph nodes is a remarkable feature of these tumours. It has often been necessary for us to carry out a careful and repeated search before discovering a minute primary lesion in a person with a massive swelling in the neck. Ninety-two per cent of our patients with cancer of pharyngeal tongue showed neck metastasis when they first saw us and 75 per cent had bilateral involvement of cervical nodes. (Khanolkar, 1944a).

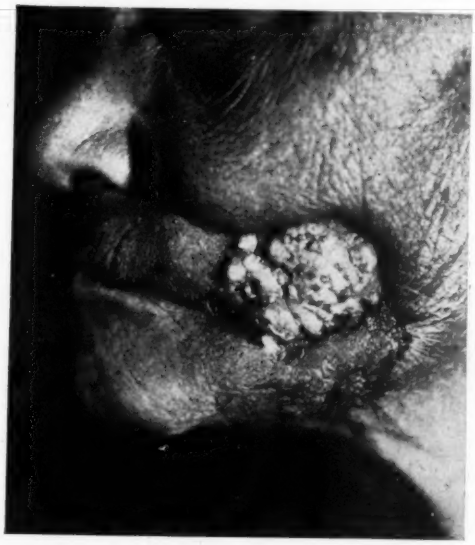
It may not be out of place to state our views regarding the treatment of these tumours as there is much confusion in the minds of most medical men on this matter. Paymaster (*loc. cit.*) has summarised our experience admirably. In early cases of cancer of the buccal portion of the tongue radiation with carefully distributed radon seeds or radium needles into the growth or deep x-ray therapy through a well-directed and sufficiently large peroral port has given us good results in our patients. Cautery excision has been useful in few cases where there has been residual disease in spite of heavy radiation. In advanced cases where treatment is directed purely towards a palliation deep X-ray therapy, from external ports and not interstitial radium therapy is recommended. The treatment of choice for cancers of the pharyngeal tongue is primarily deep x-radiation and not interstitial radium or radon seeds.

Cancer of the tongue has intrigued us for some time and we have been attempting to study the factors which may play a role in its causation. A review of our material shows that the usually accepted and oft-repeated statements regarding the importance of syphilis, leucoplakia, bad oral hygiene and betel nut chewing in the causation of such cancer was negligible in our cases. Bhagwat, Warawdekar and Mangaonkar (unpublished data) on the other hand from any laboratory have shown lowered vitamin B levels in these patients with some of the clinical manifestations of avitaminosis.

Four Stages in the Development of Cancer of the Cheek.

FIG. 6—Shows multiple patches of keratinised heaped up epithelium, with clinical evidence of vitamin B (complex) deficiency. One patch showed early malignant change.

FIG. 7—Shows a relatively early case where the new growth had spread superficially in the oral mucosa and had ulcerated in three places.



FIGS. 8 & 9—The growth had broken through on the outer side of the cheek as a fungating mass. This had taken place in 126 out of our 309 patients of cheek cancer.

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Different Stages in the Development of Cancer of the Buccal portion of the Tongue.

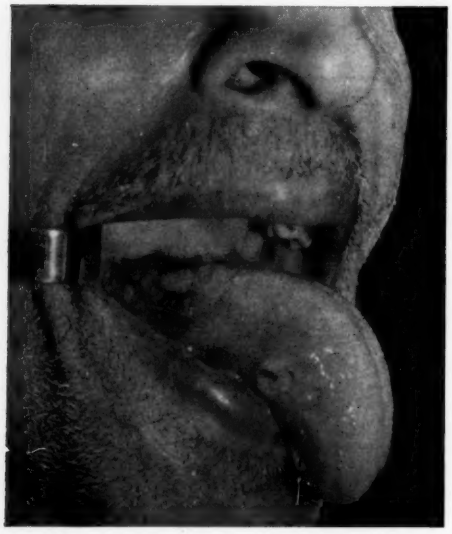

FIG. 10—Shows a small ulcer on the right edge of the tongue. The tongue is smooth, with an atrophic condition of the mucous membrane.

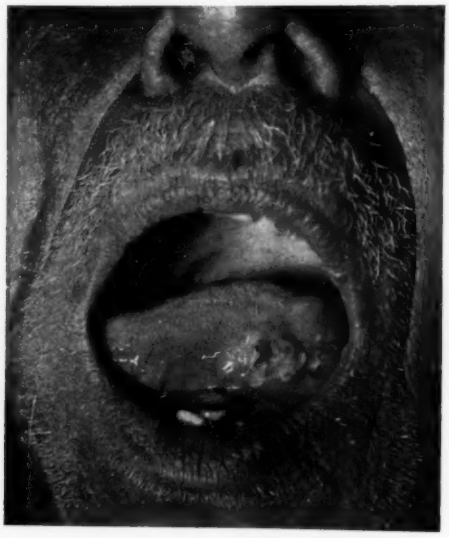

FIG. 11—Shows a bigger lesion on the left border of the tongue.

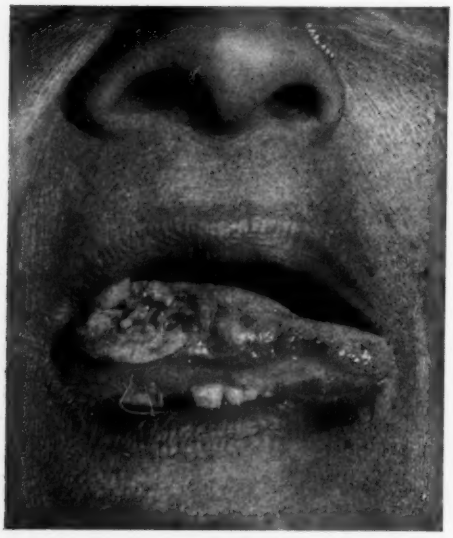

FIG. 12—Shows a large raised fungating mass with involvement of almost 1/3rd of the tongue (advanced lesion).

FIG. 13—A rapidly growing ulcerating lesion in a 30 year old man with a history of only 1½ months duration (advanced lesion).

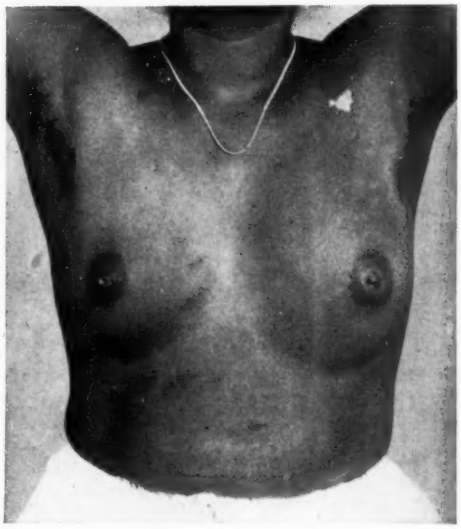

FIG. 15—Shows an early case of cancer of the lef breast. There is a swelling in the breast but the disease has not spread beyond the glandular tissue'

FIG. 16—A similar case but with worse prognosis owing to the metastatic involvement of the right axillary glands.

FIG. 17—The cancer has broken through an incision in the skin, inadvertently made by a physician. The prognosis is grave in a case of this type.

FIG. 18—A typical picture of breast cancer, usually shown in textbooks. The case is very advanced and the outlook is hopeless.

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II. *Cancer of the breast* is one of the common cancers in adult and elderly women. It is proportionately more common in Parsee women than in other communities in Bombay. The commonest age for its occurrence is between 35 and 55 though I should like particularly to point out that 22 out of our first 200 breast cancer patients were women under 35.

There is probably no other subject regarding which there is no much diversity of opinion, and sometimes vehement diversity, as the diagnosis and treatment of breast cancer. Much of this difference is based on insufficient knowledge or an incorrect appreciation of basic principles. An intensive study of the evolution of breast cancer in laboratory mice has yielded much valuable information. Khanolkar and Chitre (1942, 1944b) have shown a distinct difference in the esterase content of blood in cancer-susceptible and cancer-insusceptible mice. Ranadive (unpublished data) has made some remarkable observations on the morphological alterations in the breasts of mice after foster-nursing. But it is not yet clear how this knowledge could be applied to human cancer. I shall therefore try to bring to your notice four important facts regarding human breast cancer.

1. Pain as a symptom which led the patient to seek medical advice was found in only 6 out of our 200 patients, and oozing of blood-stained secretion from the nipple in only four cases.

2. When the so-called early clinical signs of breast cancer are obvious such as a lump in the breast, a dimpling of the overlying skin, a retraction of the nipple and an elevation of the breast, the outlook for the patient is not very good. The prognosis is much brighter when the clinical diagnosis of a small lesion is doubtful and when an adequate treatment could be undertaken at once.

3. The metastatic involvement of the axilla is a very important event, probably the most important, in determining the evolution of breast cancer. It is therefore essential to avoid all manipulations which would favour the spread of cancer cells to the axillary lymph nodes (Khanolkar, 1945a) (Fig. 14).

4. A grave prognostic sign is the presence of metastatic nodules in the skin. A physician should therefore never cut into a non-ulcerated breast tumour unless he is prepared to proceed with a radical amputation, if the tumour shows itself to be malignant. We examine the excised tumour by cutting frozen sections while the patient is under anaesthesia. Sirsat (1945) from my department has recently described the technique employed by us (Figs. 15, 16, 17, 18).

A short statement like this is sure to leave many doubts in your mind. It may interest you to read the papers by Borges (1943) and Jussawalla (1945) which review our experience regarding breast cancer with skill and judgment.

III. *Cancer of the womb* forms another large group of diseases which has been engaging our attention. In our first 5,000 patients there were 300 cases of such cancer and more than half of them were in women from Maharashtra and Karnatak. It is a distressing disease attended with much pain and suffering specially after inexpert treatment or in its terminal stages. All women, particularly women after menopause, should be suspected of womb cancer if they experience unexplained untimely excessive or irregular uterine bleeding. The results of treatment are most promising in the early stages of the disease. A systematic record of menstrual history from its commencement as seen by me in Vienna and a periodic check

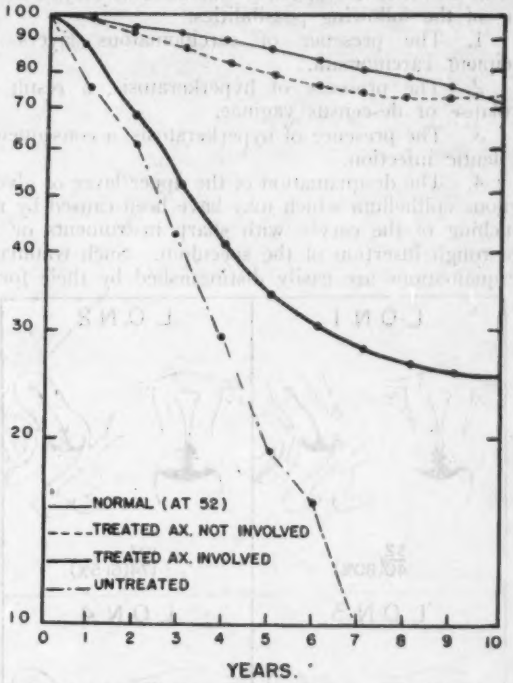

FIG. 14—SHOWS THAT THE 10 YEAR SURVIVAL RATE AFTER MODERN TREATMENT IN BREAST CANCER IS ALMOST THE SAME AS IN NORMAL 52 YEARS OLD WOMAN. WHEN THE AXILLA IS INVOLVED THE SURVIVAL RATE FALLS FROM 82% TO 26%.

up after a certain age on the lines followed in United States of America appears to be the most effective means of eradicating its hopeless forms. The effect of early diagnosis on prognosis is very well shown in Fig. 19. There is no short cut to an early diagnosis of cervical cancer. A thorough clinical examination, a properly carried out Schiller's test and a biopsy from a clinically suspicious area are essential in every case of this type.

1. Clinically an early cancer appears as a firm red slightly raised uneven patch generally near the external os. It often bleeds easily when rubbed with a cotton swab. Such an appearance should immediately rouse a suspicion of cancer. One should not wait for a hard indurated nodule before proceeding to the next step.

2. Schiller's test—Normal cervical squamous epithelium contains histologically demonstrable amount of glycogen, whereas cancerous epithelium is devoid of it. Schiller (1934) has utilised this physiological character for a test of early malignant transformation. It should be realised that ulcerated areas or areas of cubical epithelium do not take the mahogony brown

stain with iodine. A solution of iodine (1), potassium iodide (2) and water (300) is poured (10-15 c.c.) through a cervical speculum and carefully spread over the cervix and upper vaginal wall with a cotton tampon. The iodine solution is mopped away with cotton swabs and the cervix and vagina gently wiped. Any unstained areas are carefully examined as they indicate one of the following possibilities.

1. The presence of carcinomatous layers or incipient carcinomata.

2. The presence of hyperkeratosis, a result of prolapse or descensus vaginae.

3. The presence of hyperkeratosis, a consequence of leutic infection.

4. The desquamation of the upper layer of glycogenous epithelium which may have been caused by the touching of the cervix with sharp instruments or by the rough insertion of the speculum. Such traumatic desquamations are easily distinguished by their form,

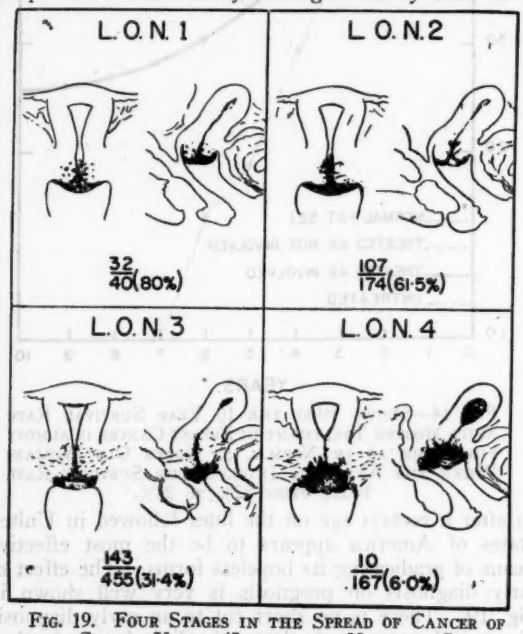

FIG. 19. FOUR STAGES IN THE SPREAD OF CANCER OF THE CERVIX UTERI (LEAGUE OF NATIONS CLASSIFICATION), AND THE RESULTS OF TREATMENT BY RADIATION (DATA MARIE CURIE HOSPITAL).

as they resemble narrow sharp and straight line scratches.

This method is really useful for deciding upon a suitable area for a biopsy examination only in an early suspicious case.

3. It is imperative in all cases of uterine cancer to obtain a piece for biopsy examination without delay. The method has been so described by Martzloff (1940) that it is worth describing it in his own words:

"The obtaining of biopsy material from such a suspicious area on the vaginal portion of the cervix is in itself so important a matter that it canot be overstressed. It may sound trite to say that material for biopsy must contain cancer before cancer can be revealed under the microscope. Most pathologists can testify to personal experience with tissue submitted to them from cancer-afflicted patients which either showed no cancer or was of debatable character, while full-blown carcinoma existed a few millimeters from the site of the specimen. Tissue removed from a small circumscribed area suggestive of cancer should include both material from the suspicious area and a generous amount to adjoining normal-appearing tissue. When a diathermy current is used one should allow for destruction by heat along the margins, where the fragment of tissue becomes unsuitable for histologic study. When a tumour is large and its character obvious, naturally observance of such minutiae is not essential. The specimen is best obtained, if possible, at the border between normal and glycogen-free cells. The block so obtained should be rectangular or nearly so . . . . and should immediately be fixed. We prefer to fix our material in Bouin's fluid, failing which 20 per cent neutral formalin solution is advisable. It is essential that biopsy tissue should not be pinched or crushed during the process of removal.

"Minute fragments of tissue, wedge-shaped pieces of tissue and material obtained by scooping out tissue with the endothermy loop may be entirely unsatisfactory. The advisability of curetting the surface of the process as has been recommended is also a dubious procedure. Ordinarily there can be little excuse for such haphazard methods when the lesion is small, circumscribed and primarily a diagnostic problem.

"One must of course recognize that early visible cancer probably has no distinctive gross appearance which permits its exact clinical diagnosis. Heretical as it may sound, it is also probably true that more advanced cancer possesses no distinctive or grossly pathognostic appearance. Its clinical recognition rests on the fortuitous circumstance that most ulcerating, indurated tumours of the portio are cancer."

There is no dispute regarding the necessity of an early diagnosis of cervical cancer, there is however much unreasonable discussion regarding the most advisable treatment when a cancer has been diagnosed. There can be no doubt about radiation as the only possible procedure when the disease has progressed to L.O.N. III or IV stage and palliation is all that may be looked for. The difference arises regarding the early cases and many people express opinions without adequate experience or reflection. Only recently a well known specialist stated that the microscopic structure of the tumour had no importance in deciding the line of treatment. The following will show you the absurdity of such a statement:

CURE RATE IN RELATION TO HISTOLOGY (CLINICAL STAGE I)

	Prickle cell	*Transitional cell*	*Spindle cell*	*Adenocarcinoma*	*Total*
Cases treated (Wertheim operation) ..	50	259	47	23	379
Operation % cure (Martzloff, 1940) ..	47	24·2	9·2	75	28·5
Cases treated (Radiation)	6	64	11	6	87
Radiation % cure (Jones, 1943)	33	58	91	16	57·5

I hope the examples which have been cited would have convinced you that an average doctor or for that matter a general consultant needs to know much more about cancer if he desires to offer useful advice and beneficial guidance to his patients. If I were asked to state this fact in the popular style I would say that a doctor when he is confronted with a probable case of cancer should observe three things and avoid three others.

1. He should never ignore the patient's complaints however trivial they may appear to him.

2. He should acquaint himself and be constantly on the alert for the earliest manifestations of malignant disease.

3. He should clinically examine his patient carefully and systematically.

I have had occasion to perform autopsies, where patients had been treated by famous consultants for abdominal tumours, liver diseases, and bone swellings for several months because they had neglected to examine the testes, the rectum or the thyroid, or even to detect a missing toe which had been amputated previously.

The three things he should not do are the following:

1. He should not temporise in a case of cancer and if he could not arrive at a decision himself he should direct his patient where he could be attended to by people who know how to proceed in the matter.

2. He should not keep the patient ignorant of his condition, once he has arrived at a definite decision. Most human beings have an unexpected reserve of courage and confidence and much needless suffering could be avoided if the patients knew what the doctor was trying to accomplish. We have watched a lot hush hush business on the part of ignorant medical and lay people usually with disastrous results to the patients.

3. He should never cut into a tumour without realising the consequences of such a procedure. When he has removed a tumour however small or innocent looking, he should subject it to an expert histological examination. This may appear a counsel difficult of realisation, but it is not so. We so often come across patients with tumours which had been operated upon previously and the specimen had found its way to the waste bucket without even a careful scrutiny. I should like to dilate a little on this question as besides the usual tragedies of tumours fungating and ulcerating through incisions made by doctors, one comes across pathetic instances where some knowledge and more restraint might have saved an unfortunate person from a sad and pitiful death. I will mention only two types of innocent looking tumours which sometimes take on an explosive activity when they are cut into or inadequately removed. The first belong to the group of brown or black moles which many people have on some part of the body from the time of their birth. For some reason not understood so far, the moles begin to grow or to bleed on slight hurt. The doctor advises removal and does so without difficulty. Within a few weeks a small crop of pigmented seedlings appear round the scar. The case has passed on to a fatal and ruthless disease. Recently Tod (1944) from Manchester caused a flutter among doctors by severely criticising the light-hearted removal of these moles by inexperienced persons. I have seen four pathetic cases of this type during the last five years. The other is a small freely movable painless, non-tender tumour in the subcutaneous tissue. It is usually very slow growing and does not seem to worry its host at all. The usual story is that the patient goes to his doctor's dispensary, who promptly cuts it out. This is easily done and the patient soon forgets all about it. In about a third of the cases the tumour recurs and keeps recurring and becoming more malignant after each removal. We despair to watch these patients progressing relentlessly after repeated operations and amputations to inescapable death from a neurogenic sarcoma.

I hope what I have told you this evening has not disappointed you by its failure to disclose some supposed cure for cancer. I also expect that it has created in you a desire to know more of this fascinating subject. Let me therefore close upon this sign of expectancy.*

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INCIDENCE OF INTESTINAL PROTOZOA AND PARASITES IN ROUTINE STOOL EXAMINATIONS

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Many surveys for detecting incidence of intestinal parasites have been carried out abroad but very few still in India and so this paper might serve some of the purpose. In this paper we have tried to analyse the incidence of the protozoal and parasitic infection from routine stool examinations carried out at Sheth Devkaran Muljee Pathology Department at Sir Hurkisondas Hospital, Bombay, during 1945, as suggested by the patients' doctors. It was not possible for us to collaborate the clinical manifestations along with laboratory findings, for various reasons. Before we proceed to analyse, few points need a note.

(1) Stool examinations were done as per instructions from patients' own doctors, for one reason or the other.

(2) All the samples brought for our examination were not satisfactory. In many instances it contained hard solid stool, as these patients were not given any saline purge by their doctors.

(3) Interval between voiding of stools and examination varied from 2 hours to 6 hours. In majority of cases, it was more than 4 hours. This interval is important as protozoal infection can be better detected if stool is examined immediately after voiding. The mortality of the vegetative forms of the protozoa, specially Entamœba histolytica, diminishes as the interval increases and one may fail to detect it or miss it with other less motile parasite, if this interval is too long and so the findings are to be viewed taking this point into consideration.

(4) Routine examination was carried out with simple saline preparation, iodine preparation and concentration method for ova in each case.

(5) The type of patients in this series were of middle class type and better socially and in hygiene than the group which is usually met with quite freely in general hospitals.

In this analysis we have restricted only to occurrence of protozoal and parasitic incidence in stools. Total number of stools examined was 856, from 1-3-45 to 31-12-45. Results are tabulated thus:

TABLE I—SHOWING INCIDENCE IN GENERAL

	Hindus		*Muslims*		*Christians*		*Parsees*		*Total*
	+ive	−ive	+ive	−ive	+ive	−ive	+ive	−ive	
Adult males ..	247	257	6	6	2	4	1	2	525(61%)
Male children ..	14	9	—	—	1	—	—	—	24(3%)
Adult females ..	144	144	4	1	—	—	—	1	294(34·5%)
Female children ..	3	10	—	—	—	—	—	—	13(1·5%)
Total ..	408	420	10	7	3	4	1	3	856

* + ive means that some protozoa or parasite was detected in stools. −ive means that none of them was detected.

From this table it will be evident that out of 856 cases 422 cases showed some parasitic or protozoal incidence while 434 stool examinations were negative. Thus 49 per cent cases were positive for some parasitic presence while 51 per cent were negative. Patel (1945) reported results of stool examinations in a series of 125 healthy persons in which 53·6 per cent were positive for intestinal protozoal or parasitic infection. Incidence according to sex and caste has also been shown in the table.

As this is meant for general incidence, more details in analysis are not useful. Incidence of caste is not absolute as majority of patients taking advantage of the laboratory are Hindus.

Detailed incidence is analysed in Table II. In the positive group some patients showed evidence of only one parasite, while in other cases various parasites were detected together. The incidence according to various groups is as follows:

From this table it will be seen that out of 856 total examinations protozoal incidence was 48 per cent,

TABLE II—SHOWING INCIDENCE IN GENERAL FOR GROUP OF PARASITES

Group	*No. of +ive Single Infection*	*No. of +ive Mixed Infection*	*Total No. of Cases*	*% age Incidence as a whole*	*Approx. % age Monteior's (1945) series of 817 stools at K.E.M. Hospital*
Protozoa ..	65	339	404	48	15
Flagelets ..	96	125	221	26	3·2
Ciliata ..	—	1	1	0·1	—
Helminths ..	48	70	118	14·2	35
Total ..	209	535	744	—	—

flagelets 26·6 per cent, ciliata 0·1 per cent and helminths 14·2 per cent.

In many cases there were mixed infections and so total positive cases were only 49 per cent *i.e.*, 422 cases. If we take incidence according to positive cases only then it will be seen that protozoal incidence

amounts to 81 per cent of all positive cases. while flagelets 44 per cent; ciliata 0·2 per cent; and helminths 24 per cent. The overlapping is due to mixed infections in many cases. Table II also shows the incidence of single infection as well as mixed infections. The term infection is not used in its true scientific sense, but presence of parasites in stools is taken as incidence of parasitic infection. In Table III we have tried to separate incidence of infection from that of carriers. Incidence of flagelets is about 26 per cent, in these series, which is worth noting. It will be seen that mixed infection is more common than solitary infection by one parasite.

In the present series, 213 out of 856 cases showed evidence of infection by more than one parasite. Multiplicity of infection in some instances was worth noting. In some cases we found combined infection with Entamoeba histolytica, E. coli, Giardia lamblia, hook worm and round worm. In one case we found both vegetative and cystic forms of Entamœba histolytica and Entamœba coli, Endolimax nana and Giardia lamblia and there were no pus cells or red blood cells. Various other combinations were quite frequently met with. For ova of helminths, we used both the simple and concentration methods in each case as a routine and it was observed that concentration method is quite useful for this purpose. Salt used for our concentration method was sodium chloride. Now we shall discuss the incidence of individual group of parasites.

Protozoal Infection

The common types met with were Entamoeba histolytica, Entamoeba coli, Endolimax nana and Iodamoeba butschlii. The following table shows incidence of various protozoa, along with its occurrence in sex. Cases which did not show any red blood cells or pus cells in stools and showed only presence of protozoa in either cystic or vegetative form, were labelled as carriers in this analysis. Out of 856 stool examinations 404 showed presence of this group thus giving 48 per cent of incidence in total. In this 71 per cent were males and 29 per cent females.

If we take incidence as a whole in female and male patients total numbering 856, it comes that about 38 per cent of all females and 53 per cent of all males had protozoal infection.

Table III—Showing Incidence of Protozoa in Stool Examinations

Forms	*Male*	*Female*	*Signs of infection present*	*Carriers*	*Total cases*	*Individual % age as a whole*	*Single Infection*	*Mixed Infection*	*Total incidence*	*Total % age*
Entamœba histolytica										
Vegetative ..	28	7	12	23	35	4	12	98	110	13
Cystic ..	56	19	14	61	75	9				
Entamœba coli.										
Vegetative ..	43	19	12	50	62	7·5	49	168	217	25·5
Cystic ..	112	43	23	132	155	18				
Endolimax nana										
Vegetative ..	18	6	5	19	24	3	4	70	74	9
Cystic ..	32	18	8	42	50	6				
Iodamœba butschlii.										
Vegetative ..	—	1	—	1	1	0·1	—	3	3	0·3
Cystic ..	1	1	—	2	2	0·2				
Total	290	114	74	330	404	—			404	

1. *Entamœba Histolytica*—This is the most important protozoa in this group and needs a special discussion on its incidence. It has by no means now remained as tropical protozoa but is cosmopolitan in its distribution. In our present series, Entamoeba histolytica in vegetative forms were detected in 35 cases only *i.e.,* 4 per cent, but of these 35, signs of infection were present in 12 cases while the rest were carriers. Cysts of entamœba were found in 75 cases while the rest were carriers. Cysts of entamœba were found in 75 cases *i.e.,* 9 per cent. Of these 75 cases, evidence of infection was present in 14, while 61 were carriers or cyst passers. Thus out of a total of 856 cases 110 showed either cystic or vegetative forms of entamœba histolytica. Thus incidence of amœbic infection comes to about 13 per cent in this series. Out of these 110 cases, 98 cases showed mixed infection while 12 cases had amœbic infection alone. Incidence in our series is low comparing to other figures. This might be partly due to long interval between voiding of stools and our examination, or to unsatisfactory samples and partly because the incidence in our series is based on one single examination. Incidence of amœbiasis quoted by various writers all over the world varies from 1 to 72·5 per cent, Craig (1944), estimates the incidence of amœbiasis in civilians of U.S.A. upto 10 per cent and suggests that it might be still more if repeated examinations are done. Bink (1943) stated incidence in England to be 5 to 10 per cent. In some parts of Russia it is reported to be 10 to 30 per cent. In India various writers from various places have quoted different figures. Danbar and Stephens (1930) reported incidence of 21·9 per cent amongst South Indians. Das Gupta and Knowles (1943) in Calcutta of about 11 per cent in Bengal, while Patel (1945) reported incidence to be 43·3 per cent amongst 125 apparently healthy persons in Bombay. Incidence of healthy carriers reported by Craig in U.S.A. in his series of 161 cases was 15·5 per cent. Gharpure (1945) reported amœbic cyst in 56 cases out of 970. Monteiro (1945) reported incidence of E. histolytica in 103 cases out of a total of 817 stools thus giving about 12·5 per cent. In 75 cases of this series there were trophozoites present. The incidence reported by

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Patel (*loc. cit.*) from Bombay is highest so far known by us in India. This is quite possible in view that in neighbouring places like Ceylon the incidence of amœbiasis is reported to be as high as 75·8 per cent (Manson Bahr. 1939). The figures in our series would have been perhaps little higher than what is reported now, if the stools would have been examined immediately after voiding with a saline purge and also if repeated examinations would have been carried out, as it is known that cysts are often passed intermittently.

These facts show the importance of repeated examination of stool with satisfactory sample after a saline purge. Out of our 110 cases where either amoebic cyst or vegetative forms were present 84 cases *i.e.*, 10 per cent, did not show any evidence of infection and were labelled as carriers. According to Westphal (1938), E. histolytica is normally a harmless parasite living in intestine and becomes harmful under some circumstances, but Craig (1936) states that there are no non-pathogenic races of E. histolytica.

Persons who had clinical amœbic dysentery or intestinal amoebiasis in the past, pass cysts of E. histolytica for a long time. Some persons who had no such previous attacks also pass cysts in their stools. The apparent absence of pathogenicity of the parasite in some human subjects and its modification in others has been the subject of much speculation. The asymptomatic carrier of E. histolytica or the so-called 'cyst passer' has invariably lesions in the mucosa and submucosa of the large bowel but these are insufficient in number and extent to give rise to gross clinical signs. There is some experimental evidence that strains of E. histolytica differ in virulence but there is no evidence that they are non-pathogenic. There is no evidence of racial or group tolerance to this parasite, but an infection for a long time tends to establish a host-parasite equilibrium and clinical manifestations of the parasitisation diminish.

2. *Entamoeba Coli*: In our series these were positive in 217 cases out of 856, thus giving positive incidence of 25·5 per cent. Craig in his monograph reports incidence of E. coli in U.S.A. from 16 to 60 per cent. Manson Bahr mentioned incidence of 15 per cent in normal persons. Incidence in males and females is given in Table III. Out of positive 217 cases, there were trophozoites in 62 cases *i.e.*, in 7·5 per cent and cysts in 155 cases *i.e.*, in 18 per cent. Incidence of healthy carriers in these cases was about 22·5 per cent. Entamœba coli are more commonly found than E. histolytica. Pathogenicity of the latter is much more than that of the former and so it is essential that one should not be mistaken for the other.

3. *Endolimax Nana*—Incidence in our series has come to 9 per cent, out of which about 6 per cent were apparently healthy carriers. Incidence of Endolimax nana infection reported in U.S.A. by Craig is from 9 to 29 per cent. Other details are given in Table III.

4. *Iodamœba*—We came across only 3 cases in our series, thus giving only 0·3 per cent of incidence. Faust states that it is more frequent in children than adults.

5. *Diantamœba Fragilis*—Incidence reported by Craig is about 2 per cent. We did not come across any case.

Flagelets

The incidence of these parasites in our series of 856 cases is shown in Table IV.

The table shows the incidence of flagelets in our series. It is 26·4 per cent in this series of cases. Out of this, incidence of Giardia lamblia infection alone is about 25·5 per cent. Giardia lamblia vegetative forms were found in 14 per cent while cystic forms in 11·5 per cent of all cases.

Table IV—Showing Incidence of Flagelets

Parasites	*Females*	*Males*	*Total*	*Signs of Infection*	*Carriers*	*% age Individual Infection*	*Total Incidence*	*% age as a whole*	*Solitary Infection*	*Mixed Infection*
Giardia Lamblia										
Vegetative ..	44	73	117	12	105	14	213	25·5	92	121
Cystic ..	34	62	96	2	94	11·5				
Trichomonas Hominis										
Vegetative ..	1	—	1	—	1	0·1	2	0·1	1	—
Cystic ..	—	—	—	—	—	—				
Chilomastix mesnilli										
Vegetative ..	2	5	7	1	6	0·8	7	0·8	3	4
Cystic ..	—	—	—	—	—	—				
Total	81	140	221	—	—	26·4	221	26·4	96	125

Incidence reported by Dr. Monterio from K. E. M. Hospital, Bombay, of Giardia lamblia infection amounts, to only about 3 per cent in his series of 817 cases. Our figures show that the infection with this parasite is quite frequent and needs attention.

Ciliata

Incidence of this group is quite negligible in our series. We met with only one case where there was Balantidium coli present in the stools.

Helminths

This is again an important group responsible for various intestinal troubles in human beings. The incidence in our series of 856 cases is tabulated in Table V.

It shows the incidence of various intestinal parasites in usual routine stool examinations. The figures reported by Dr. Monteiro (1945) from K.E.M. Hospital Pathology Department, Bombay, have been mentioned in the last column.

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TABLE V—SHOWING INCIDENCE OF PARASITES

Parasites	Females	Males	Single Infection	Mixed Infection	Total Cases	% age of incidence in present series	% age of Monterio series of 817 cases
Cestodes T.saginata	—	—	—	—	—	—	0·4
Hymenolopis Nana	—	12	4	8	12	1·5	—
Nematodes Ascaris lumbricoides ..	22	26	20	28	48	6	14
Thread worm ..	—	1	1	—	1	0·1	0·3
Whip worm ..	12	8	8	12	20	2·5	11
Ankylostoma (hook worm) ..	15	21	14	22	36	4	9
Strongyloids Stercorales ..	—	1	1	—	1	0·1	—
Total ..	49	69	48	70	118	14·2	34·7

We might point out that the majority of patients attending our laboratory are middle class people and much better in financial and social aspects, than those attending the K. E. M. Hospital. Secondly, the occupation of the majority of the males in our group is service in some form or other and they are literate, with better idea of hygiene and environments. This might explain the low incidence of helminths in our series.

Majority of our patients were vegetarians and so incidence of Tinea infection is negligible. Incidence of round worm and hook worm infections in our series is 6 and 4 per cent respectively while that of K.E.M. Hospital is 14 and 9 per cent respectively. Incidence of hook worm in Bombay is thus not very high. Manson Bahr (1942) reports incidence of hook worm infection in some parts of Panama and Ceylon to be about 90 per cent. In cities, because of no-field work, incidence is not likely to be so high.

We have tried to give an idea of the occurrence of various protozoa and parasites in routine stool examinaitons. Knowledge of gastro-intestinal disorders is gradually improving with the help of various laboratory aids, out of which to our mind routine stool examinations stand first. This stresses that no patient with any gastro-intestinal disorder should remain without routine stool examination.

We have avoided all sorts of descriptions of individual protozoa or parasite as they are well known to all. Readers are however requested to refer to standard text books of parasitology for finer details, if they wish so.

Before we conclude, we take the opportunity to thank all the members of our laboratory staff who have helped us in one way or the other in this effort. We thank also the authorities of Sir Hurkisondas Hospital for permission to publish this paper.

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THE PRESENT STATE OF HEALTH IN THE PUNJAB*

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In the course of his professional work a medical practitioner is frequently called upon to attend on cases of many kinds of communicable and preventable diseases and he often finds that at a particular time a large majority of the patients under his care happen to be suffering from the same disease. This occurs, as is well known, on account of the epidemiological fact that most of the diseases exhibit well marked seasonal periodicity and further that epidemics generally occur in cycles. Precise information, however, regarding variations in disease prevalence in his locality is usually not forthcoming. If he refers to his text books, he finds curves relating to foreign countries or to only large tracts of area in India. Workers in Lahore, for instance, will not find any book or reference where the seasonal distribution of each disease occurring within the Corporation area of Lahore is described.

To every intelligent medical worker, this knowledge is of paramount importance and we are indeed surprised that, so far, no attempt has been made to visualise and describe the health picture and to plan out preventive and curative work in the light of such knowledge. Might we go forward and say that without such knowledge we work almost blindfolded. To be forewarned is to be forearmed and it would add considerably to the efficiency of the medical worker if he could be told some of the simple yet fundamental facts about the epidemiological history of the chief diseases occurring in his area. Not only that, he should know what factors *e.g.*, climatic, dietetic and socio-economic, influence the propagation of the more frequently occurring diseases. Further, he should be well acquainted with the fundamental climatic factors; for instance, what is the normal range of temperature or rainfall; which are the most humid or the hottest and the coldest months and what effect have these variations generally on the incidence of disease in the locality.

Many of these facts are known only after a long stay and practice in the place, but there is no reason why a medical worker should not be supplied this information in a handy form as a guide in the very beginning of his professional career. The supply of

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this valuable information for each place separately in a handy form, in the shape of illustrated charts and maps is indeed a task that the Indian Medical Association might well take in hand. This is a suggestion which the parent executive body might consider.

The task is a huge one, and having made the suggestion, it is expected from us that we should give the lead by describing the disease patterns to you. To discuss each place, separately, would require deeper study than the one we have been able to make and it cannot be reported in a single paper. If we get opportunities we intend to report our results in subsequent papers.

In this preliminary study it is proposed to discuss in general terms the present health and mortality conditions on a broad basis so that you can at least be shown how we, in this province, compare with similarly constituted areas in British India.

The Punjab has frequently been called the 'sword arm of India' and in the second world war it contributed man power to the tune of over a million persons. The valour and prowess of the Punjabi have indeed become subjects of keen emulation. But as we shall show in the subsequent discussion, all this has been achieved in spite of considerable handicaps.

From the health point of view, all has not been well with our people. "The true greatness of a state" remarked Bacon, "consisteth essentially in population and in breed of man". It is, therefore, of the utmost importance that the physique and health of our people must receive serious thought not only from experts in this province but also from those at the helm of India's military affairs. We are sure that many of the handicaps affecting our people can be removed if an Association, such as yours, tackles the problem in all its implications and with a determined will.

It is generally believed that the climate of this province as also its topography, the racial stock as well as diet are all favourable for a Punjabi's sturdy make up. This may be granted, but there actually exists a number of diseases and physical ailments which have been eating into the very core of our people and, if these adverse forces are not kept under check, untold loss can result once some of these are unleashed.

Chief Diseases of the Punjab

The only source from which we can get some idea of the prevailing diseases in the province is the annual report on the working of hospitals and dispensaries in the Punjab prepared by the Inspector General of Civil Hospitals. In this, all the treated cases are classified under 93 separate headings. Table I shows the average annual admissions from each of those in decreasing order of magnitude. We have tried to combine some of the diseases into broader groups; for instance, the figures for all the diseases of the eye are brought together, so also are diseases of the teeth or gums, of ear etc. The data pertaining to the period from 1934 to 1942 have been analysed.

Table I—Showing in Decreasing Order of Magnitude the Total Patients Treated each Year on the Average from 1934-1942 as per Annual Reports of the Hospitals and Dispensaries in the Punjab

No.	Diseases	Annual average of the total treated
1.	Malaria	2,236,599
2.	Other diseases of eye	2,118,249
3.	Trachoma	1,396,723
4.	Other diseases of the skin and nails excluding tumours	1,210,520
5.	Diseases of the ear	1,162,457
6.	Ulcerative inflammation	1,128,056
7.	Diseases of the respiratory system	1,011,282
8.	Other diseases of the digestive system	946,251
9.	Injuries general and local	777,254
10.	Diseases of the stomach excluding tumours	700,950
11.	Diseases of the teeth and gums	549,496
12.	Diseases of the intestines excluding diarrhœa, dysentery and tumours	534,318
13.	Other diseases of areolar tissue	368,761
14.	Diseases of the nervous system	336,394
15.	Diseases of the bones, joints and muscles	299,006
16.	Diarrhœa	268,132
17.	Other diseases of the female generative system excluding tumours	227,775
18.	Scabies	213,468
19.	Diseases of the nose	207,123
20.	Pyrexia of uncertain origin and other diseases due to infection	186,711
21.	Bacillary dysentery	109,609
22.	Diseases of blood and spleen	91,777
23.	Other diseases of the male generative system excluding tumours	85,576
24.	Amœbic dysentery	83,998
25.	Cataract	73,695
26.	Other diseases of the urinary organs excluding tumours	67,082
27.	Pneumonia	54,133
28.	Inflammation of lymphatic glands and vessels	42,580
29.	Rheumatic fever	39,724
30.	Influenza	33,799
31.	Other diseases of the liver	33,767
32.	Goitre	32,939
33.	Enteric fever	25,705
34.	Glaucoma	25,048
35.	Other diseases due to deficiency or to disorders of nutrition or metabolism	21,907
36.	Diseases of the circulatory system	19,890
37.	Other diseases due to metazoan parasites	19,665
38.	Other forms of tuberculosis	18,154
39.	Syphilis	16,707
40.	Labour cases	13,864
41.	Gonococcal infection	12,615
42.	Tumours benign	12,459
43.	Tuberculosis of lungs	11,759
44.	Stone in the bladder	7,518
45.	Other diseases of the lymphatic system	5,820
46.	Diseases of the new born infant	5,296
47.	Ankylostomiasis	4,909
48.	Nephritis	4,538
49.	Diseases of the breast excluding tumours	4,439
50.	Other poisoning	3,718
51.	Other diseases of the ductless glands	3,643
52.	Mental diseases	3,588
53.	Ascites of unknown or doubtful origin	3,512
54.	Labour abnormal	3,496
55.	Other diseases of venereal origin	3,095
56.	Rickets	2,897
57.	Measles	2,870
58.	Appendicitis	2,825
59.	Diabetes	2,725
60.	Sandfly fever	2,292
61.	Scurvy	1,976

TABLE I—(*Contd.*)

No.	*Diseases*	*Annual average of the total treated*
62.	Tumours malignant (others)	1,790
63.	Hydrocele	1,631
64.	Guinea-worm diseases	1,613
65.	Leprosy	1,483
66.	Osteomalacia	1,019
67.	Liver abscess	1,015
68.	Tumours malignant—skin	935
69.	Tumours malignant—uterus	854
70.	Smallpox	839
71.	Cholera	754
72.	Filariasis	592
73.	Xerophthalmia	582
74.	Diphtheria	533
75.	Soft chancre	491
76.	Meningococcal infections	483
77.	Tumours malignant—breast	466
78.	Opium poinsoning	461
79.	Relapsing fever	329
80.	Elephantiasis	326
81.	Intestines—tumours malignant ..	291
82.	Tumours malignant—mouth	275
83.	Dengue	241
84.	Tumours malignant—œsophagus and stomach	224
85.	Tumours malignant—rectum	180
86.	Typhus fevers of unknown vector ..	166
87.	Plague	161
88.	Epidemic dropsy	130
89.	Tumours malignant—penis	114
90.	Typhus fevers—louse-borne	88
91.	Beri beri	68
92.	Kalaazar	32
93.	Typhus fevers—tick-borne	7

Altogether, 17 million persons on the average receive treatment for various diseases each year from state-owned or aided dispensaries in the province. Out of these, the diseases of the eye top the list. More than three and a half million persons are treated each year for eye afflictions in the state-owned or aided hospitals and dispensaries. We know that for various reasons all persons suffering from such diseases do not and cannot seek treatment in these institutions. According to the table, the diseases of the digestive system occupy the second place with 2·7 million cases. Malaria is third in the list with 2·2 million cases treated each year. The other diseases that are responsible for the annual admission of over a million cases each year are the diseases of skin and nails (excluding tumours), diseases of the ear, ulcerative inflammation and diseases of the respiratory system excluding tumours and tuberculosis of lungs.

The patients treated for tuberculosis of lungs are about 12 thousand per year and this figure is less than even one per cent of the cases treated for malaria. If these comparisons at all enable us to judge the relative importance of the two diseases in the province, then the indication is that malaria is many times a more important cause of ill-health as against tuberculosis. The proportion of tuberculosis of lungs to other respiratory diseases is only 1 per cent.

One of the most obvious observations to be made on this table is that there is very great difference in the relative importance of different diseases. The eye diseases alone are responsible for 21 per cent of the total number of patients and malaria 13 per cent.

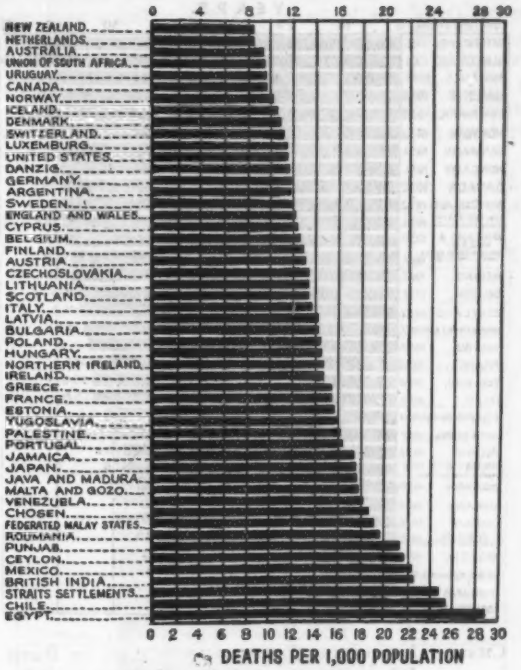

CHART I—SHOWING DEATH RATES PER 1000 OF POPULATION FOR CERTAIN COUNTRIES AND FOR THE PUNJAB DURING 1936

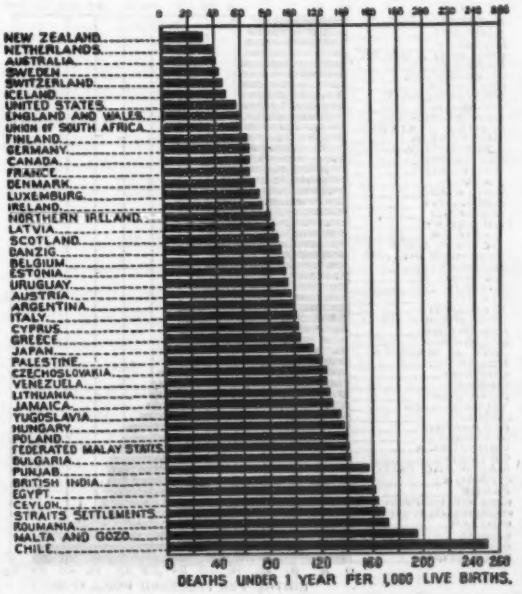

CHART II—SHOWING INFANT MORTALITY RATE PER 1000 LIVE BIRTHS FOR CERTAIN COUNTRIES AND FOR THE PUNJAB DURING 1936

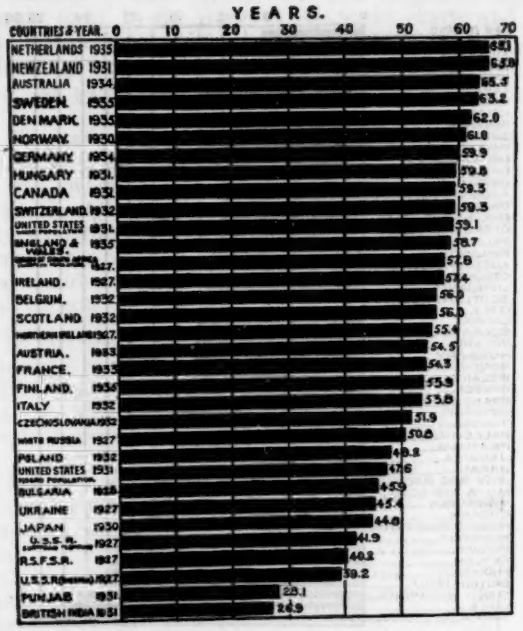

CHART III—SHOWING EXPECTATION OF LIFE AT BIRTH FOR MALES IN CERTAIN COUNTRIES

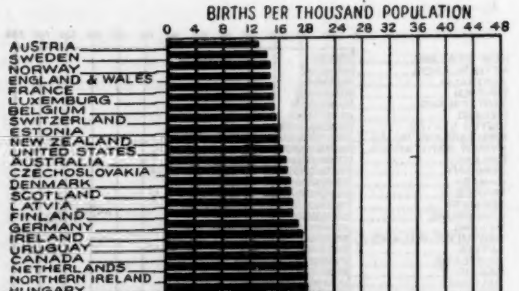

CHART IV—SHOWING BIRTH RATES PER 1000 OF POPULATION FOR CERTAIN COUNTRIES AND FOR THE PUNJAB DURING 1936

The first three groups of diseases, namely, eye diseases, diseases of the digestive system and malaria together are responsible for half the sickness. This is a very important point to be borne in mind. The first 7 groups of diseases together cause 80 per cent of the total sickness as reflected by the hospital and dispensary figures and 96 per cent of the admissions arise from the first fourteen groups of causes shown in Table I.

The relative importance of some of these causes in terms of percentages is as follows:—

	Diseases or groups of diseases	*Percentage of the total number of patients treated*	*Cumulative totals of the diseases starting from the first*
1.	Eye diseases	21	21
2.	Diseases of the digestive system excluding tumours	16	37
3.	Malaria	13	50
4.	Diseases of the skin and nails excluding tumours ..	9	59
5.	Diseases of the ear	7	66
6.	Ulcerative inflammation ..	7	73
7.	Diseases of the respiratory system excluding tumours and tuberculosis of lungs	7	80
8.	Injuries general and local		
9.	Diseases of the teeth and gums		
10.	Diseases of areolar tissue		
11.	Diseases of the nervous system		
12.	Diseases of the bones, joints and muscles	16	96
13.	Diseases of female generative system excluding tumours		
14.	Diseases of the nose		

Half the present sickness would disappear if eye diseases, malaria and the diseases of the digestive system could be adequately controlled. Our knowledge regarding the precise causes of sickness in the group of eye diseases and the digestive system is not very clear, but we know that of the total eye diseases 40 per cent are cases of trachoma, 2 per cent of cataract and about 1 per cent of glucoma.

In the group of diseases of the digestive system, dysentery and diarrhœa are responsible for 17 per cent and enteric for just 1 per cent.

PRESENT STATE OF MORTALITY CONDITIONS

As compared to some of the advanced countries of the West, our death-rate is very high. This can be seen from Chart I in which death-rates for a number of countries have been shown. Six countries in this chart, *viz.*, New Zealand, Netherlands, Australia, Union of South Africa (White), Uraguay and Canada had rates lower than 10 per thousand—more than double the rate for the Punjab. But this crude death-rate is well known to be an unsatisfactory criterion for comparing mortality conditions which have different age distributions. For example, whilst our crude death rate is twice as high as that of Britain, we know that the mortality rate amongst infants in the Punjab is actually three times that in England and Wales. This difference becomes more marked amongst

children, and for the age group 10 to 15 years, the Punjab death-rate is as high as six times; the two rates being 9·2 per mille and 1·5 per mille for the Punjab and for England and Wales respectively. The reason why the crude death-rate does not correctly reflect such wide differences in mortality conditions is that our population, owing to its higher mortality, is much younger than that of Britain and the total deaths in a younger population—other things being equal—are relatively less. It is more appropriate, therefore, to discuss death rates at specific age periods.

Infant Mortality Rate

The rate at which infants die is generally regarded as a fairly sensitive index of the health conditions of an area. This rate for the Province is exceedingly high. In Chart II, these rates are shown for a number of countries. As compared with that of New Zealand, which claims to have the lowest infant mortality rate of 30 per 1,000 live births, the Punjab rate is more than five times. Thus, for every single baby dying per 1,000 live births in New Zealand, as many as five are being allowed to be strangled out in the Punjab. Almost two lakhs of infants die each year—a national wastage of an enormous magnitude. These deaths alone constitute about 30 per cent of the total deaths each year. "This enormous slaughter of the innocents" observed Sir Alexander Russell "constitutes a health problem of the utmost importance", and we may add that there will be sharp repercussions on the future age constitution and the population growth in the province if once the problem is properly tackled.

Expectation of Life

The expectation of life figures at birth are a measure of the average number of years a person may be expected to live under the prevailing health conditions. The latest estimates available for the Punjab relate to 1931. In that year, males in this province had an expectation of life of 28·1 years and females of 26·6. How pitiably low these figures are, can be seen from a comparison made in Chart III in which a large number of countries have been arranged in order of decreasing values of expectation of life for males. The position of the Punjab is extremely low; only its value exceeds that for the whole of British India by a small difference of 1·2 years.

It is well known that the reproductive span of a woman begins at about 15 years of age and extends up to 45 years or more.

With an average life span of 28 years the Punjabi women are not living through even half the child bearing period. In spite of this handicap *i.e.*, with only 12 to 13 years of reproductive life, and with considerable widowhood at even earlier ages, the female population has been presenting to the province more than two and a half times the number of babies which women would bear in some of the advanced countries of the West. It is indeed not a pleasant reflection that the weight of child-bearing on a Punjab woman is many times more than that in many other countries. The position is further aggravated by the low nutritional status of the mothers. This drudgery has, indeed, been very exacting and, no wonder, a very large number (almost 1 out of every 50 expectant mothers) sacrifice themselves at the altar of motherhood. Our net balance of about 4 lakhs each year in the Punjab is being secured at a high cost in terms of the lives actually lost and in health shattered during reproduction. In Chart IV are shown the birth rates for a number of countries.

We may also compare the Punjab with the other provinces. We know that birth-rates and death-rates

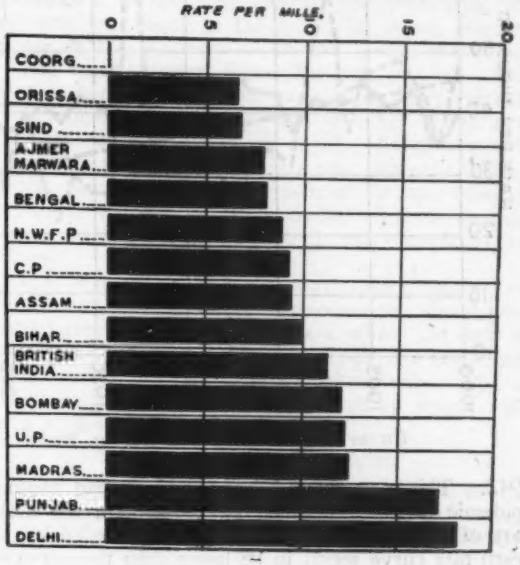

Chart V—Showing Mean Rate of Natural Increase (Birth Rate—Death Rate) in the Provinces and British India from 1932 to 1941

are both high in these provinces. An interesting comparison is, however, afforded by a study of the difference between the birth and the death-rates, *viz.*, the natural increase. Figures for this rate of natural increase are shown in Chart V. The Punjab stands out with a high rate of increase.

Trends in Health Conditions

The topmost position that the Punjab occupies amongst the larger provinces in respect of the rate of natural increase has been achieved in spite of low standards of health and environmental hygiene. Naturally one may ask what would have been the resultant increase in population if we had possessed the normal health and standards of sanitation approaching those enjoyed by some of the advanced countries of the West. To examine this point we must understand the trends that are now in operation bringing about changes in numbers as well as the attitude of the people towards reproduction. We have studied the figures of birth and death-rates for the province from 1900 onwards for each year and the actual rates are shown in Chart VI. The trend of the birth-rate over this period of 45 years has been

almost stationary indicating that no significant change in the attitude of the people towards reproduction has taken place. The death-rate curve has recorded some very violent changes in this period. The highest peak occurred in 1918 due to the pandemic of influenza which swept away about a million lives from the province. The peak next in magnitude corresponds to the year 1907 when plague was at its highest pitch. The peak in 1924 is also attributable to an epidemic of plague. In recent years a minor peak occurred in

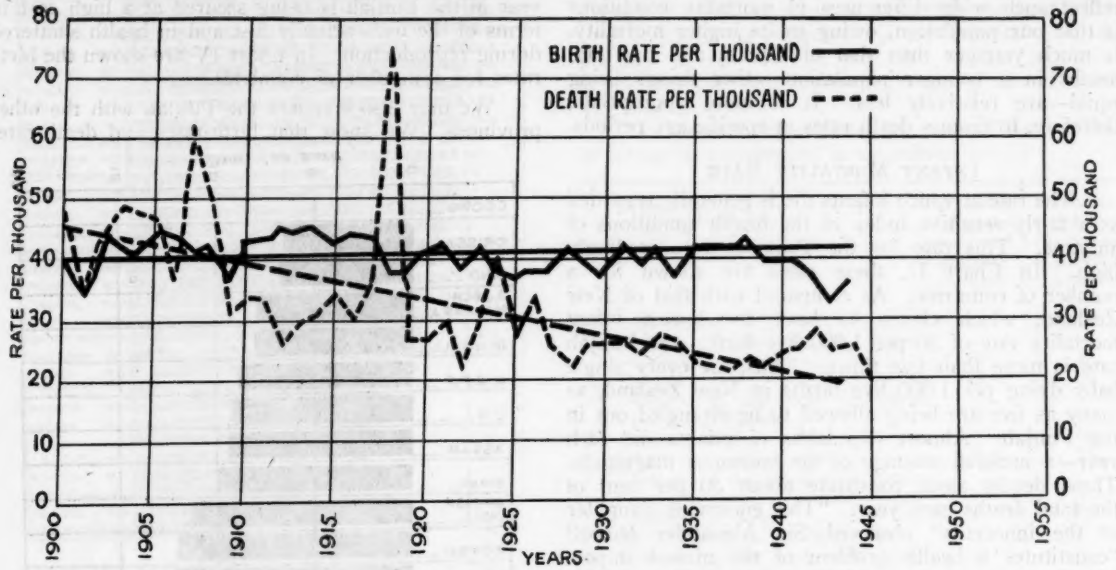

CHART VI—SHOWING THE ACTUAL BIRTH AND DEATH RATES FOR THE PUNJAB FORM 1900 ONWARDS

1942. This was caused by a wide-spread regional epidemic of malaria which swept through the major part of the province. If we ignore these peaks, the death-rate curve seems to be lower than the curve for the birth-rate and is specially so in the more recent period. An important observation is that the general tendency for the death-rate during this period of 45 years has been towards decrease. A scrutiny of the two trend lines, *viz.*, for the birth-rate and the death-rate will show that the difference between the two has been gradually widening and that we may look forward to a still faster rate of natural increase in this province.

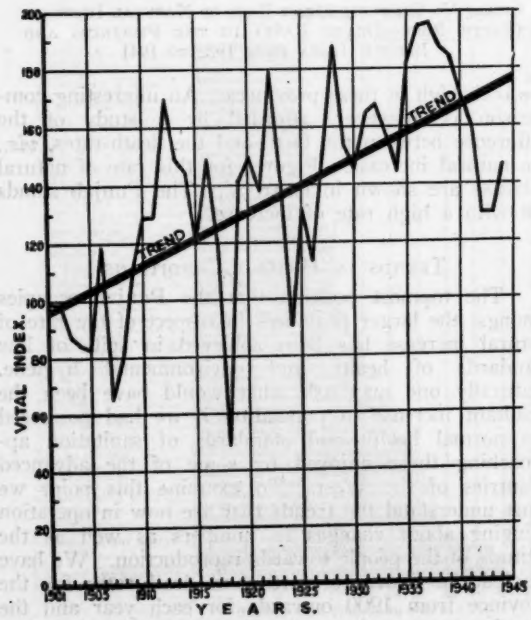

CHART VII—SHOWING TREND OF VITAL INDEX IN THE PUNJAB FROM 1901 ONWARDS

The effect which the war has had on our birth and death-rates can also be studied from this chart. In 1939, 1940 and 1941 the birth-rates were 41, 41 and 40 respectively. In 1942, the year of malaria epidemic, the birth-rate had dropped to 37 per 1,000. But we cannot argue that this decrease was due to the out-break of malaria which occurred during the last four months of the year. The lowest birth-rate of 1943, *viz.*, 32 per 1,000 was due in no small measure to the after-effects of the epidemic of malaria and we may note that in 1944 the birth-rate has again gone up to 37 per 1,000. As regards death-rates during war years a gradual rise occurred until a peak was reached in 1942 contributed largely by the malaria epidemic of that year. In 1943 and 1944, the death-rate has been 25 per 1,000. We expect that with the return of normal condition in the country both the birth and death-rates will again follow the trend indicated in this chart. If that happens, the gulf between the birth and death-rates will further widen out. It is an interesting problem to study whether there will be enough food for all if such an accelerated rate of growth continues unchecked.

Vital Index

A study of the changes in health conditions can also be made in a simple manner by calculating the percentage of birth to death-rates. This is called the *vital index*. If this index is more than 100, the population can be regarded as a healthy and a growing one. On the other hand, if the index falls below 100, the population cannot be regarded as holding its own and innately the condition is not a sound one. For the Punjab, this index is shown for each year from 1901 onwards in Chart VII. A thick line shows the trend. There are very considerable fluctuations. The three low values were recorded in 1907, 1918 and 1924. In spite of these fluctuations, the general tendency is for the index to increase. At the beginning of the present century the index was 100, if not lower, *i.e.*, the population was then just holding its own. Before the Second World War, however, this index had well nigh touched the 200 level in 1938. Thereafter, a fall has occurred for some years together and it is satisfactory to note that in 1944 this downward trend was arrested and we hope that the year 1945 also has shown some improvement. Figures for 1945 are not yet available.

Seasonal Distribution of the Various Causes of Mortality

In our opening paragraph we referred to the seasonal distribution of the important causes of mortality. These are shown in Chart VIII. For purposes of comparison we have assumed that the total deaths from each of the different causes were the same in a year and have thus worked out the monthly deaths from each cause on the assumption that throughout the year 1,000 deaths occurred from each cause. The height of the bar against each month indicates the relative importance of that cause of mortality. Out of the sixteen causes of mortality shown in this chart, three in particular, *viz.*, malaria, plague and cholera exhibit a very pronounced tendency to appear only in three to four months of each year. Epidemic malaria is primarily a disease of the last quarter, plague is concentrated in the first half of the year with its maximum prevalence in the month of April, and an increase in the incidence of cholera occurs mostly in the months of August, September and October. On the other hand, the seasonal variation is least marked in tuberculosis of the lungs and of other forms and also in the case of whooping cough. Small-pox and chicken-pox show two peaks in a year, *viz.*, the winter and the summer rises. Measles is at its maximum in the summer months, whilst cerebrospinal fever records its peak in the month of March and pneumonia in January.

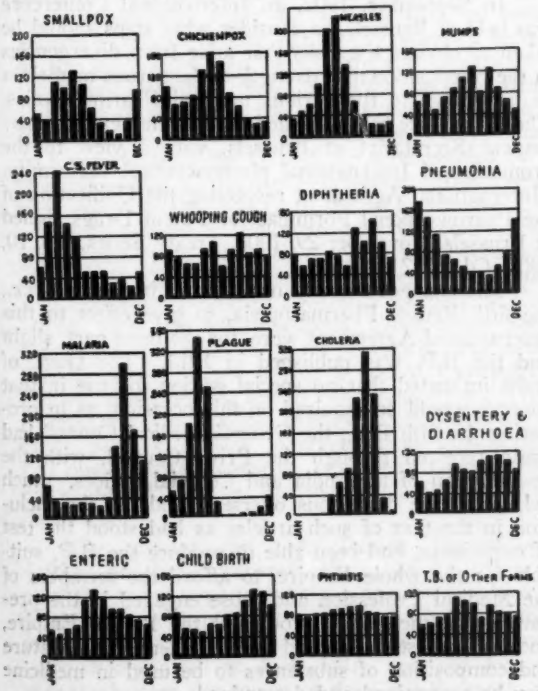

Chart VIII—Showing Seasonal Distribution of the Different Causes of Mortality in the Punjab on Assumption that 1000 Deaths Occurred from each Cause in a Year

It is known that such seasonal distributions differ from district to district and, therefore this discussion on the figures of the province as a whole has only a limited practical value. We only repeat our hope that similar curves for each individual locality will be worked out, and an Association, such as yours, will take a leading part in this study.

Summary and Conclusions

It is suggested that a systematic study should be carried out to determine precisely the nature of variation in different diseases prevailing in each locality in India.

The health conditions have been described on a broad basis for the Punjab as a whole. A significant observation is that eye diseases are responsible for the largest amount of sickness and these together with the diseases of the digestive system and malaria account for 50 per cent of the total attendance in the various hospitals and dispensaries in this Province. Malaria alone is responsible for the attendance of over two million patients in the hospitals and dispensaries of the Province.

Our Province compares unfavourably with the advanced countries of the world. In respect of mortality amongst infants and children the Punjab rates are larger by four or more times the rates in some other countries. Birth-rate is also much higher than that of other countries with the result that excessive reproduction is resulting in considerable wastage of human life of inants and mothers.

In spite of our low standards of health and hygiene, the population is on the increase at an accelerated rate of growth. The trends that are now in operation further indicate that in the near future, whilst the birth-rate is likely to remain almost stationary, the death-rate may continue to fall thus providing a still larger balance or net increase each year. This increase may well raise serious population problems in the near future. It may well be asked whether by raising the health status we are not at the same time creating conditions under which such achievement may not at all be lasting.

SPECIAL ARTICLES

I

A PLEA FOR AN INDIAN PHARMACOPOEIA

ANIL KUMAR SEN, M.B.,

Member, Drugs Technical Advisory Board and the Indian Pharmcopoeial List Committee, Govt. of India.

While inaugurating the Indian Medical Association, the Fifth session of the All-India Medical Conference, passed the following resolution on December 29, 1928, at Calcutta:—"That this Conference is of opinion that, from the points of view of economy, easier adaptability, growth and conservation of country's resources in respect of vegetable drugs which naturally grow or can be grown in India, an Indian Pharmacopœia is a necessity and efforts should be made to compile the same as early as practicable."

It may be mentioned here that, in 1844, there was published at Calcutta, by order of the Governor-General in Council, the Bengal Dispensatory and Pharmacopœia, (Vol. I., the Dispensatory, in 1841, and Vol. II., the Pharmacopœia, in 1844), edited under the sanction of a Special Committee by Dr. W. B. O'Shaughnessy, M.D., Professor of Chemistry, Medical College, Calcutta.

The General Medical Council of Great Britain, in compliance with and under the sanction and authority of the Acts of Parliaments, reduced to uniformity the several processes and descriptions of the Pharmacopœias of London, Edinburgh, and Dublin, and published in 1864, in London, the first British Pharmacopœia. The second B.P. was published in 1865.

The "Bengal Pharmacopœia" was superseded in 1868 by the publication of the "Pharmacopœia of India," prepared, under the authority of Her Majesty's Secretary of State for India, by Dr. Edward John Waring, assisted by a Committee, appointed by the Secretary of State, for that purpose. This work included all the articles official in the British Pharmacopœia, together with indigenous products of India, forty in number, whose established claims as medicinal agents entitled them to be designated 'Official' and also included under the description of 'Non-Official', a large number of articles whose reputation was not so well established, but which, possessing considerable activity, were deemed worthy of attention. A few additional drugs as to which it was thought desirable to obtain further information were included on account of their high native repute or marked physical characters.

In 1874, an Addendum to the second B.P. was published. The third B.P. was issued in 1885, and an Adendum to it, in 1890.

On the 12th of December, 1891, the India Office addressed a letter to the General Medical Council, Great Britain, transmitting suggestions from the Government of India, as to certain items in the Pharmacopœia, and conveying the information that though the Medical Act 1858 of Great Britain has not been made applicable to India, yet so far as the preparation of compound medicines is concerned, the formulae laid down in the B.P. are invariably folowed by the Government Medical Stores Departments, as well as by private chemists and druggists. The G.M.C., on May 26, 1893, adopted a resolution authorising its Pharmacopœia Committee "to enter into correspondence through the Privy Gouncil with the India Office and the Colonial Office, with a view to ascertaining in what degree, if any, the B.P. can be better fitted than at present to meet Indian and Colonial requirements, as regards important natural drugs and pharmaceutical preparations." Twenty-eight communications in all were received from India and the Colonies regarding the revision of the B.P. with special reference to the local requirements. Important reports were also received from a Special Committee appointed by the Government of India, in 1894.

The fourth British Pharmacopœia was published in 1898, containing in its text, many of the recommendations received from India and the Colonies, and a small number of alternative substances or preparations, the official recognition of which had been desired for local use, were sanctioned for this purpose by their introduction in an Appendix.

The Indian and Colonial Addendum, in which medicinal plants and other substances suggested for inclusion by Indian and Colonial Authorities were dealt with more fully than in the fourth B.P., was published in 1900, which at the request of the Govt. of India, was modified in a few particulars to suit Indian requirements and published as the "Government of India Edition" in 1901.

In September, 1902, an International Conference was held at Brussels, to consider what steps should be taken to obviate the risks that arise from divergencies in the composition and strength of dangerous medicines as laid down in the various national Pharmacopœias. The Conference recommended the appointment of a permanent Secretariat at Brussels, with a view to the promotion of International pharmaceutical uniformity. (International Agreement respecting the Unification of the Pharmacopœial Formulas for Potent Drugs signed at Brussels, November 29, 1906, Treaty Series, No. 10, 1907, Cd. 3392).

The changes actually necessitated in the next *i.e.*, the fifth British Pharmacopœia, to give effect to this International Agreement were, for the most part, slight and the B.P. was published in 1914. The Govt. of India intimated that no special edition for use in that country would be required on this occasion, as in preparing the fifth B.P., the General Medical Council had again received through the Privy Council, with the co-operation of the India and Colonial Offices, much help from the dominions overseas, and, by the inclusion in the text of such articles as had stood the test of experience, had been able to produce the B.P. suitable for the whole Empire, to afford the members of the Medical Profession and those engaged in the preparation of medicines throughout the British Empire, one uniform standard and guide, whereby the nature and composition of substances to be used in medicine may be ascertained and determined.

In the course of the preparation of B.P. 1914, a question arose as to the inclusion of the therapeutic sera vaccines, and other substances used in medicine,

to which the ordinary methods of assay employed in the Pharmacopœia were inapplicable. The Therapeutic Substances Act was passed in 1925 and came into operation in August, 1927 and the Regulations made thereunder prescribed the standard of strength, quality and purity of the therapeutic substances, the tests to be used and the units of Standardisation. In September, 1925, the Second International Conference on the Unification of the Formulae of Powerful Medicaments was held. A series of recommendations and resolutions was adopted and embodied in a 'Project d' Arrangement International,' which included a revision of the decisions of the First Conference, together with an extension dealing with the powerful medicaments in a similar way. The Conference advised the recognition of Biological Methods of Standardisation which have been, or may be, recommended by the Health Section of the League of Nations, and approved of the formation of an International Secretariat for the unification of Pharmacopœias, and formation of two other International Committees for the investigation of assay processes and methods of making galenical preparations. In the meantime, in accordance with the International Opium Conference and the adopted Convention relating to Dangerous Drugs (Geneva Convention), the Dangerous Drugs Act was passed in 1920, and the Home Office Regulations thereunder were published on the 24th May, 1921, to regulate the prescribing and dispensing of certain habit-forming potent remedies.

In 1925, the Pharmacopœia Committee of the General Medical Council invited to a Conference delegates from a number of medical, pharmaceutical, and scientific societies likely to be interested, on certain general questions arising out of the proposed revision of the B.P. 1914. In May 1928, the Committee of the Civil Research, Sub-Committee on the British Pharmacopœia—which had been appointed at the instance of the Lord President of the Privy Council on a request from the G.M.C. as recommended by the Pharmacopœia Committee,—presented their report, recommending the G.M.C. to set up a Selection Committee to appoint a 'Pharmacopœia Commission who should undertake the work of preparing future issues of the B.P. under the general direction of the Council. The Selection Committee appointed by the G.M.C. resolved that the Pharmacopœia Commission should consist of a Chairman and three persons holding medical qualifications (*a*) one having a special knowledge of Clinical Medicine, (*b*) one of Pharmacology and Therapeutics and (*c*) one of Therapeutic Substances, and three persons holding pharmaceutical qualifications, (*d*) one of Pharmacognosy, (*e*) one of General Pharmacy and (*f*) one of Pharmaceutical Chemistry and Analysis.

The present—the sixth British Pharmacopœia (1932) has been prepared with a design to include only the more important 'standard articles which are in general use throughout the British Empire, excluding many substances as have mainly a local use which were incorporated in B.P. 1914, and the following paragraph from the report of the Civil Research Subcommittee on the B.P. being borne in mind:—"Where it is desired that official recognition should be given in any part of the Empire to any local drugs or local substitutes, we suggest that this should be left to the Government concerned, which by means of Supplements or Addenda, to which they may accord the necessary sanction, can meet any local requirements or introduce any modifications or alternatives desired."

The last B.P. was published in 1932. The Government of India is the only body who has got the statutory power of issuing such Supplements or Addenda for the British India. For full twelve years, the Government of India, in the Department of Health, Education and Lands, did not care to take any initiative in the preparation of such an Indian Addendum. During the last Global War, the General Medical Council in Great Britain thought it their duty to issue more than seven addenda to the B.P., as war emergency measure. In 1943, Dr. A. K. Sen, M.B., the elected representative of the Indian Medical Association, in the Drugs Technical Advisory Board, Government of India, submitted a Memorandum with a plea for the early compilation of an Indian Addendum, to the Director General, Indian Medical Service, who also happens to be the *ex-officio* Chairman of the D.T.A.B. During the last war, the Government of India had to resort to the use of Indian substitutes and other Indian raw materials of potency different from that prescribed by the B.P. for the preparation of B.P. drugs for the supply to the war services, due to the scarcity of B.P. raw material in India, and they also advised the Indian drug manufacturers to do the same for the supply to the civilians as well as to the military. As the Indian manufacturers were all reluctant to do so until and unless these are provided for by the publication of an Indian Addendum to the B.P., the Government of India, to tide over the crisis, had no other alternative than to address the following letter No. 2338-H(C)/43, dated January 26, 1944, to the Secretary, D.T.A.B. containing, among others, the intimation "that the Government of India have decided to ask the Drugs Technical Advisory Board to prepare the material for a list of drugs in use in India which, although not included in the B.P., are of sufficient medicinal value to justify their inclusion in an Official Pharmacopœia and to recommend what standards should be prescribed to secure uniformity and what tests should be used to establish identity and purity. The list when approved and issued by the Government of India, will be known as the Indian Pharmacopœial List and will constitute the Official Indian Supplement to the B.P." The Government further intimated that "considerable material is available as a result of the Indigenous Drugs Enquiry which has been in progress for a number of years under the direction of Lt.-Col. Sir R. N. Chopra. Any further investigation that may be necessary in order to determine the standards to be laid down can be carried out at the Biochemical Standardisation Laboratory or, by arrangement, at other Government Laboratories." The Government further directed that "it will be necessary to set up a Committee to examine the material for the List and to report to the Board and the Government of India will be glad if the Board will forward for the approval of the Government their proposals for the constitution of

such a Committee. The Government also desired that the approval of the Government should be obtained to the procedure which the Board proposes to follow, and further that the general practice of the British Pharmacopœia should be followed in compiling the List.

The Drugs Technical Advisory Board, on March 14, 1944, submitted the following note regarding the personnel, procedure and scope of the proposed Indian Pharmacopœial Committee:—*Scope*—The investigation on the possibility of inclusion in to the proposed Indian Addendum to the B.P. of (1) Drugs not included in the B.P., but of which the therapeutic value has been established; (2) Therapeutic Substances not included in the B.P., such as Bacteriophages; (3) Indigenous substitutes for B.P. drugs; (4) Indian raw materials of potency different from that prescribed by the B.P. The investigations relating to these, where necessary, should be carried out in all important laboratories, government or otherwise, where there are facilities and workers available for the purpose. The Indian Pharmacopœial Committee should distribute this work from time to time among these laboratories in order to expedite these investigations. *Personnel of the Committee*—Bt.-Col. Sir R. N. Chopra, C.I.E., M.A., M.D., SC.D., F.R.C.P., Chairman, Dr. P. Kutumbiah, B.A., M.D., M.R.C.P., Professor of Medicine, Andhra Medical College, Dr. B. N. Prasad, M.SC., M.B., D.T.M., PH.D., Professor of Pharmacology, Patna Medical College, Dr. B. B. Dikshit, M.B.B.S., D.P.H., M.R.C.P., PH.D., Officer-in-charge of the Dept. of Pharmacology, Haffkine Institute, Bombay, Dr. Anilkumar Sen, M.B., Mr. S. N. Bal, B.S. (Pharm.), PH.C., M.S., Curator, Industrial Section, Indian Museum, Botanical Survey of India, Mr. M. L. Schroff, A.B., M.S., Dr. Sudhamay Ghosh, M.SC., D.SC., F.R.I.C., Professor of Chemistry, School of Tropical Medicine, Calcutta, and the Secretary of the D.T.A.B. as the Secretary of the above Committee *ex-officio*. The Government of India, accepted these proposals and with the addition of Dr. B. N. Ghosh, M.B.E., L.M., F.R.F.P.S., Professor of Pharmacology and Therapeutics, Carmichael Medical College, Calcutta, and Dr. B. Mukerji, D.SC., M.D., F.N.I., Director, Biochemical Standardisation Laboratory, Government of India, constituted the Indian Pharmacopœia List Committee.

The Committee submitted its final report on the First Indian Addendum to the B.P. in October, 1945. Six months have passed,* but the Chairman, D.T.A.B. has not thought it important enough to call a meeting of the Board to consider the same. The global war is over, the difficulties which the government had to face during the war regarding supply of drugs to the military are now non-existent, so no Indian Addendum to the B.P. is necessary to the Government of India which is an alien government.

So far back as in 1933, the Indian Medical Association, while considering the Indian Medical Council Bill, requested the Government of India to alter the Bill in such a way as to include in the Bill the following clause:—"The Indian Medical Council shall cause to be published under their direction a Book containing a list of medicines and compounds, and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed, and containing such other matter and things relating thereto as the Indian Medical Council shall think fit, to be called 'The Indian Pharmacopœia', and the Indian Medical Council shall cause to be altered, ammended, and republished, such Pharmacopœia as often as they shall deem it necessary." This was on the lines of the Medical Act of Great Britain. As is usual with our alien Government, they did not agree to it at that time.

The Indian Medical Association, since its inception in 1928, is demanding, from its various platforms, for the early compilation of a National Pharmacopœia for India, which is of paramount importance to scientific medicine, pharmacy and the growth of indigenous drug industry, which naturally would have an important bearing on public health and national well-being.

As early as in 1837, when India was ruled by the East India Company, and before the publication of the first British Pharmacopœia in Great Britain, the Committee, appointed by the Governor General in Council, consisting wholly of European Officials, but real expert scientists, "to enquire into various subjects connected with the state of the Materia Medica of the British India, etc.," unanimously reported in favour of the expediency of compiling a Pharmacopœia for Bengal and Upper India. The then Government of India accepted their recommendation and the result was the publication of the "Bengal Pharmacopœia" in 1844. Even in 1865, Her Majesty's Secretary of State for India in Council organised a Committee of wholly European personnel who were scientists of repute, to supervise the preparation and sanctioned the publication of a pharmacopœia for India, and the "Indian Pharmacopœia" was published in 1868. "In endeavouring to impart an educational character to the Indian Pharmacopœia, the Committee felt that they have taken the surest mode of carrying into effect one of the primary objects of the work, namely, the introduction of the indigenous products of India into European practice in that country. If they are ever to come into general use in hospitals and dispensaries throughout India, it is to the Medical Colleges and Schools that we must look in the first instance. It is there that a correct knowledge of them should be first instilled, that the student should be familiarised with the articles themselves, that he should be made acquainted with their physical characters and medicinal properties, during the period of student life, that he should become practically instructed in their employment in the treatment of diseases. On value of knowledge thus gained, it is impossible to place too high an estimate, familiarising, as it will, the embryo practitioner with remedies which are at hand in the remotest corners of our Indian Empire, rendering him in a great measure independent of costly imported

* This article was received for publication in March 1946 —ED., *J. Indian M. A.*

articles, and effecting a considerable annual saving to the State."

This sane and sound policy was followed by the then Government of India later on and the outcome of this was the publication of the "Government of India Edition of the Indian and Colonial Addendum to B.P." in 1901 and the further publication of an exhaustive Imperial B.P. of 1914. Be it carefully noted, that during this period, Pharmaceutical and Drug Industries were not much developed in Great Britain and export of such drugs and medicaments to the Indian market was not much, as only a negligible portion of the people of India could afford to resort to the allopathic system of medicine. The first great world war gave much impetus to the development of drug industry in Great Britain and comparatively large numbers of the people of India began to resort to the allopathic system of medicine, stimulating increased import of such drugs to the Indian market. Hence the *volté face* of the alien Government of India. They wanted to make India the dumping ground of imported drugs from the British and other European countries, and so tried their best to hamper the legitimate growth of the infant drug industries in India, which was at that time trying to raise their heads. The Government of India opposed the compilation of an Indian Pharmacopœia and connived in the bringing out of the B.P. 1932 in its present concise form, excluding majority of the indigenous drugs of Indian origin which were incorporated in the previous B.P. 1914.

The Drugs Enquiry Committee (1930-31) appointed by the Government of India and presided over by Col. Chopra, recommended, for the proper and scientific development of the drugs industry in India, among other things, "the compilation of an Indian Pharmacopœia without delay, on the lines of the British and the United States Pharmacopœiæ, to contain such of the therapeutically active substances and pharmaceutical necessities as are found suitable for India and substitutes and additions for indigenous materia medica."

An ideal National Pharmacopœia should contain, so far as practicable, all those drugs and preparations which experience shows to be in common use by medical practitioners and which in the interest of the public require a standard method of preparation or a standard of strength or a standard of purity, provided that such drugs and preparations have a therapeutic or diagnostic value or are pharmaceutically necessary. It must contain not only a carefully scrutinised list of current drugs of repute, but also authoritative standards —in case of all potent and dangerous drugs and therapeutic substances, accepted International Standards—whereby the purity and efficacy of these drugs may be tested. With the submission of the Indian Pharmacopœial List Committees' recommendations, a National Indian Pharmacopœia can easily be compiled in no time.

The Committee of Civil Research Sub-Committee on the British Pharmacopœia (1928) recommended:

(Concluded on col. 2)

II

QUACKERY

AMIR CHAND, M.B., B.S., F.R.C.P.E., LT.-COL., I.M.S., (RETD.)

The word quackery is derived from the cry 'quack quack' made by the domestic duck, and it has come to mean the noisy and boastful pretensions or mean practice of a quack, particularly in medicine. By quack we as a rule mean an unqualified doctor, but may I ask what is there to prevent a qualified doctor from making boastful pretensions and behaving otherwise like an unqualified person? Quacks are found both in and outside the profession and the quackery within the profession is to my mind the worst form of quackery.

Quackery in the Profession

Quackery is of course older than the medical profession, but the exploitation of therapeutics by large commercial concerns through the medical profession is a recent development mainly due to the use of modern methods of large scale advertisements. Some firms make sweeping therapeutic claims for their products in a light-hearted manner, claims in support of which they have little or no direct evidence. A firm with huge capital can employ highly skilled methods in conducting propaganda and this is being done in an unimaginable scale. Many years ago it was estimated that a famous group of patent and proprietary medicine vendors catering chiefly for nervous and digestive disorders had spent a sum of nearly a million pounds for press advertisement alone during one year. It was further estimated that the capital employed in America in making secret remedies was larger than that employed in the legitimate drug trade. If it were a clean trade that would be no matter for regret, but what is it that is sold and bought? A few patent and

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(Concluded from col. 1)

—"The British Pharmacopœia is, after all, an adjunct of the practice of medicine. It is primarily a 'list of medicine', a list, that is, of medicaments which the doctor uses for the healing of human ailments. Its purpose is to give authoritative recognition to, and to ensure the purity and conformity to standard of, medicaments used in medical practice. *We regard the imprimatur of the General Medical Council as a fitting guarantee that the work fulfils this, its main function.*"

India is bound to have its national and democratic form of government in the near future and the national government should, at its earliest opportunity, amend the Indian Medical Council Act in such a way as to authorise the Medical Council of India to own and publish the Indian Pharmacopœia from time to time. Medical and pharmaceutical professions are in urgent need of this, and public health and national honour demand it.

proprietary preparations are good, and the claims made for them, as claims go, are not unreasonable. A good many preparations that do little or no good and little or no harm are sold at fantastic prices. Now and again some thing is sold that does definite harm. That there is an enormous number of preparations which are fraudulent in the degree of the advertisement, fraudulent in the claims they make, and very fraudulent in the way in which those claims change without any change in the nature of the so called specific. The rule or declaration that articles are to be advertised to the medical profession only is absolutely worthless as a guarantee against fraud. Advertising to the public direct is expensive, while advertising to or even circularising the medical profession is relatively cheap. So the profession is being made the best selling agent of the manufacturer, and the extent to which it is functioning in that respect indicates the extent to which quackery prevails in the profession.

A quotation of some remarks by Dr. Simmons—an editor of Journal of American Medical Association—will reveal the extent to which this has been going on: "It has become a recognised fact in the patent medicine field that the easiest and the cheapest way of reaching the public is through the doctor. Let me quote a paragraph that appeared in the Printer's Ink—an advertising Journal. The words are those of a patent medicine man, and they are not directed to the medical profession: But the patent medicine of the future is the one that will be advertised only to the doctors. Some of the most profitable remedies of the present time are of this class. They are called proprietary remedies. The general public never hears of them through the daily press. All their publicity is secured through the medical press by means of the manufacturer's literature, sometimes gotten out in the form of a medical journal, and through samples to doctors. The original bottle is given to the patient, he sees that the remedy does him good, and when he feels a trifle run down again, he goes to a drug store and buys another bottle, not troubling the doctor. He meets a friend in the street who is not looking well. 'I know exactly how you feel', he says. 'Now go and buy a bottle of best thing in the world. My doctor prescribed it for me, so it is'nt a patent medicine.' In this way the names of remedies advertised only to physicians get abroad to the general public. The proprietary medicine of the future will be advertised through these channels. The medical papers will reap the harvest, and the physician himself always so loud in the denunciation of patent medicines will be the most important medium of advertisement at the command of the proprietary manufacturer." Those words written about 42 years ago have turned out to be absolutely true and prophetic.

With regard to the evil of proprietary medicines Dr. Simmons further says, "In brief, this business, the annual profit of which runs into millions, has grown until the use of proprietary remedies by many physicians has almost displaced the use of the individual official drug. It has checked advance in scientific methods of treatment, inhibited intelligent clinical observation, and developed an optimism that is unwarranted by facts, an optimism that is more fatal than the most radical therapeutic nihilism. But above and worse than all, this commercialised materia medica has blighted our literature by debauching our medical journals and even by tainting our text books."

The following remarks by the select committee which sat in England a long time ago go home much deeper:

"We have learned, however, to our great surprise that persons of influential social positions and small means will sell the use of their names to advertise secret remedies; that large sums of money are expended in canvassing medical men; that many medical men give testimonials (with the use of their medical qualifications, but without the use of their names) to proprietary and secret remedies, and allow themselves to be made, as a medical man declared in a public address, 'the cat's-paw and fool of the fraternity of the secret remedy'; and that there are medical men who prescribe to their patients remedies of this class of whose composition they are themselves largely ignorant. We have evidence in two cases of medical men acting as directors of companies manufacturing secret remedies."

This, then, is one form of quackery which is going on in the profession. Another form, no less deplorable, is the tendency to treat patients from symptoms alone without making proper examinations and investigations on scientific lines with a view to arrive at a diagnosis. It is forgotten that a necessary preliminary to treatment is the knowledge of disease—its causes and its diagnosis. How many of us in our general practice do, as a routine, the examinations which in our student days we were taught to do in the clinical side room? How many of us keep in touch with the current medical literature? Do not many of us continue to practise as we had been taught when we were students and show little tendency to grow intellectually and scientifically? Is it then any wonder that the real quack with his boastful pretensions scores over us? It is our fault, our weakness, not his superiority or cleverness.

Quackery outside the Profession

So much about quackery within the profession to which I attach greater importance than to quackery outside it. If India is a country of diverse religions, languages, dialects, customs, geographical and climatic factors, and many other things, it is also a country of diverse systems of medicines. Every kind of pathy, old or new, indigenous or foreign, good or bad, revealed or man-made, scientific or fradulent, flourishes in this land much too much to the detriment of mankind. If the science of physics, or chemistry, or biology, can be one all over the world why not the science of medicine which is nothing but an application of these and some other sciences, such as anatomy, physiology, pathology, bacteriology, and pharmacology? There could not be two anatomies and two physiologies, nor two different causes of syphilis,

or gonorrhœa, of cholera, or tuberculosis, or malaria, or small-pox for example. There can be no controversy over these sciences, and no one should be recognised as a qualified practitioner until he had approved training in these sciences, and had studied the nature of disease and its diagnosis. This training should be the same for all. There could not be the least compromise in this matter. Once a man had passed the tests at the end of his training he should be at liberty to follow his predilections short of prescribing secret remedies. He might then if he wished, become homœopath, naturopath, ayurvaid, or anything else. Truth would triumph in the end, though not necessarily in individual instances. No one, whatever his view on law might be, can practise as an advocate unless he has undergone the training prescribed by a faculty of law, why should the same not apply to medicine?

Remedies for Quackery

Coming to the remedies for quackery, first within the profession. No doctor should ever prescribe, and no medical journal should ever accept an advertisement of, a secret remedy, or a preparation of whose composition and action he is ignorant, or a patent or proprietary drug for which there is an equally good substitute in the pharmacopœia, or a substance which is advertised directly to the public, or indirectly to the public by means of literature sent with the bottle stating the disease it is intended to cure, or for which unwarranted, exaggerated, or misleading claims and statements as to its therapeutic value are made, or which is useless on account of its unscientific composition. There should be set up some agency or organisation like the Council on Pharmacy and Chemistry composed of leading chemists, pharmacologists and clinicians, appointed by the American Medical Association to examine and report on all proprietary remedies. American experience has shown that it is possible to do this, and that it is of great service to the medical profession, but it has also shown that the work is difficult and expensive. In India at least it can, for some time to come, be taken up by the State alone.

Every doctor should keep his professional knowledge up-to-date and should conduct his practice on scientific lines, ever keeping the good of the public and his readiness to avail himself of useful knowledge from whatever quarters it came as his guiding principles.

Now, secondly, remedies for quackery outside the profession, I am not one of those who advocate that unqualified practice should be forbidden by legal enactment. This is entirely impracticable. It has not been done and, I believe, it can never be done in any country unless perhaps it is under a totalitarian regime. What I advocate is that unqualified practice should not be recognised by the medical profession and the State, that the State should prevent an unqualified person from prescribing, administering or applying a substance which contains a scheduled poison —and the list of scheduled poisons should be revised every now and then—and from performing an operation which requires surgical skill, or an anæsthetic, local or general, or is life-endangering, or concerns a vital part of the body and a list of such operations should be prepared and revised every now and then.

No one should be recognised as a qualified medical practitioner of any system who has not had a certain prescribed minimum standard of general and scientific and professional education, and who does not possess a registrable medical qualification approved of by recognised medical councils in the respective provinces.

Covering and Association with Unqualified Persons

The question of consultation or association with the practitioners of indigenous systems often crops up. The Punjab Medical Council has laid down that any registered medical practitioner who either by administering anæsthetic or otherwise assists an unqualified person to attend, treat, or perform an operation upon any other person in respect of matters requiring professional discretion or skill, will be liable on proof of the facts, to have his name erased from the register. It further says in a Note that if a Registered practitioner has been called in by the patient or his friends to advise and has found such a practitioner in attendance and has rendered assistance to the patient, the council will not consider such action of itself to be of a reprehensible character.

On one occasion Col. N. King, Registrar of the General Medical Council in the U. K. said, "If a registered practitioner was responsible for the treatment and took a patient to a masseur or a light specialist or anybody else and said, "I want a certain treatment given to this patient covering would not arise even if the doctor might not know exactly how to administer the treatment."

This means that a registered practitioner may ask a practitioner of an indigenous system to give a certain treatment to a certain patient and that it would not amount to covering because the registered practitioner will himself be responsible for the treatment the patient would receive. But the position would be totally different if the registered practitioner was employed by or was working under the other practitioner or recognised him as a duly qualified person acceptable to a medical council for registration. The essence of the whole thing then is that the initiative must rest with the registered practitioner and the other practitioner must work under him.

These observations based as they are on a comparatively narrow range are offered as an invitation to a wider discussion of a very important subject.*

* Lecture delivered at a meeting of the Lahore Branch, I.M.A., on 1-12-45.

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CENTRAL DRUGS LABORATORY

In a recent case two accused brothers were charged with selling medicines which were below the standard required. Mr. Justice Meredith and Mr. Justice B. K. Ray of the Patna High Court heard the case at its circuit session at Cuttack. The prosecution case was that the accused knowingly sold quantities of inferior medicines which were neither in accord with the labels on the bottles nor up to British pharmacopœia standard which was claimed for them or in accordance with the guarantee as regards quality issued by them. Both the accused were convicted and sentences of lower court were enhanced. Mr. Justice Meredith after stating that the "extent to which this swindling of the public" was being carried out was evidenced by the fact that there were about 15 to 25 travelling agents who were going all over India and that in 1943 business of over Rupees two lakhs was made, characterised the accused as "War profiteers as bad as, if not worse than those in food, for they operated with the utmost callousness at the expense of the health and perhaps even the lives of people." He also observed, "That the petitioners should have been able to supply worthless and indirectly, dangerous goods of this kind shows that there is something seriously wrong and I would like to impress upon the authorities the need of legislation to ensure a high and uniform standard for all medicines supplied to the public. It is not only necessary that factories of the kind should operate under Government licence but there should be a system of frequent and thorough inspection of their working and products and supply of bad and useless medicines should in itself, in my opinion, be an offence incurring heavy penalties."

The Indian Medical Association is taking a keen interest in the problem of purity, potency and effectiveness of drugs for a long time. We draw the attention of our readers to some articles and editorials published in the year 1940,[1, 2, 3, 4, 5] during the enactment of Drugs Act of 1940. We emphasised the need of a Central and Provincial Drugs Laboratory at an early date. In the absence of a Drugs Standardisation Laboratory or a Therapeutic Trials Committee one cannot scientifically evaluate the claims of drugs. In America, the American Medical Association has the "Council of Pharmacy and Chemistry" which brings before the profession relevant informations regarding old and new medicines or proprietary preparations. In England the "Therapeutic Trials Committee" under the Medical Research Council has an almost similar function. We are aware of the huge quantity of adulterated, understrength and faked drugs which are being sold with the most exaggerated and fantastic claims. There is no law to prevent the publication of those nostrums such as cure of cancer, tuberculosis, rejuvenators, camouflaged abortifacients to gullible public even in the daily press. There is not only a huge financial loss and self-medication of the public but all these may mean a question of life and death *e.g.*, faked quinine ampoule in a case of malignant malaria or understrength diphtheria anti-toxin in a case of diphtheria.

In our country efforts to control this drug scandal started in 1930 with a Drugs Enquiry Committee with Prof. R. N. Chopra as its Chairman. This Committee recommended (*i*) the enactment of our All-India Drug Legislation and (*ii*) the establishment of a machinery for the testing, checking and standardisation of drugs. A Drugs Act was introduced in 1940 and a Control Order was framed in 1944 but the Act has not yet been fully enforced. The Drugs Control Order is concerned only with price of drugs and does not guarantee the purity and strength of the drugs sold to the public. Chopra and Mukerji in their extensive survey of the quality of drugs in India between the years 1937-1940 found that as many as 49 per cent of the drugs ordinarily available from the open market, of both Indian and European origin, did not agree with the standard specifications or with the claims made on the label of the containers.[6] In 1937, the Government of India published a scheme for a Drugs Control Laboratory, to protect the public against misbranded or adulterated drugs and honest producers against unfair and enforced competition. But uptil now no such laboratory is functioning. The popular Interim Government has already laid the foundation stone of many important Central Laboratories. We hope the foundation stone of a Central Drugs Laboratory will also be laid at an early date. Because it is the primary obligation on the part of the Government, a function accepted by all modern Governments, to see that pure and standardised drugs are available to the suffering public.

[1] Sen, Anil Kumar—*J. Indian, M.A.*, **9**:324, 1940.
[2] Memorandum of the I.M.A. on the Drugs Bill 1940—*Ibid.*, **9**:338, 1940.
[3] Editorial—*Ibid.*, **9**:362, 1940.
[4] Sen, Anil Kumar—*Ibid.*, **9**:383, 1940.
[5] Editorial—*Ibid.*, **9**:542, 1940.

[6] Mukerji, B.—Presidential Address in Section of Physiology, 32nd Indian Science Congress at Nagpur, 1945.

CURRENT MEDICAL LITERATURE

Mumps Meningoencephalitis

Holden and others (*J.A.M.A.*, **131**:382, 1946) write that in 100 consecutive hospitalized mumps cases a study was made in an effort to determine the incidence of clinical and subclinical involvement of the central nevous system by the mumps virus.

Thirty-three cases showed clinical signs of meningoencephalitis; 28 of these showed abnormal spinal fluid.

Ten cases presented evidence of subclinical involvement of the central nervous system: 8 increased spinal fluid protein to 30 mg. per hundred cubic centimeters or over, 4 pleocytosis of 10 cells or more per cubic millimeter and 2 both abnormal total protein and pleocytosis.

3. There was no correlation between the occurrence of central nervous system involvement, the severity or number of salivary glands involved or the presence of epididymo-orchitis.

4. Mumps meningoencephalitis is fast becoming a well known entity which can be definitely diagnosed with the aid of the newer serologic tests. The exact diagnosis by these methods is frequently of the utmost importance in the absence of salivary gland involvement.

Epidemic Epididymo-orchitis in Malta

Tunbridge and Gavey (*Lancet*, **1**:775, 1946) write that a non-specific epididymo-orchitis developed in epidemic form among Service personnel in Malta during the summer of 1943.

The cases were characterised by a short prodromal fever, an apyrexial interval of 6 days, followed by a second, testicular fever accompanied by unilateral testicular swelling, which subsided considerably during the first week, leaving residual swelling, which usually resolved within a month.

The local physical signs indicated an epididymo-orchitis with greater stress on the epididymis.

Though complete recovery was the rule, the epidemic caused substantial invalidism during the summer. Atrophy of the testis followed in 2 patients, and another showed doubtful atrophy.

The aetiology of the condition—a primary (non-specific) epididymo-orchitis—is discussed. It is found that there is insufficient evidence to incriminate either a gonadotropic strain of sandfly fever or undulant fever as the cause of the epidemic.

What is Normal Temperature

It is commonly stated in textbooks that the normal range of oral temperature in the healthy human body is from 97° to 99° F. (36·1° to 37·2° C.) and that the rectal temperature is 0·5°—1·0° F. (0·28°—0·55° C.) higher. This corresponds approximately to the results obtained by many investigators and may be accepted as a working guide in temperate climates. A very cursory dip into the literature, however, is sufficient to reveal that the extremes of normality may be wider than this, though the great majority of healthy individual have body temperatures within the limits given above: thus, Ivy (*Gastroenterol.*, **5**:326, 1945) found that the oral temperatures of 276 healthy students sitting in class after breakfast varied from 96·5° to 99·3° F. (35·8° to 37·4° C.); Du Bois (quoted by Ivy, *loc. cit.*) gave the range for oral temperature as 97° to 100·2° F. (36·1°—37·9° C.); while Renbourn and Bonsall (*Brit. M.J.*, **1**:909, 1946) show that during the summer months in North India both British and Indian troops may have oral temperatures up to 100·6° F. (38·1° C.) and rectal temperatures up to 101°F. (38·3°C.). The relation between oral and rectal temperatures, too, is apparently not nearly as constant as is commonly taught; Carmichael and Linder (*Am. J. Med. Sc.*, **188**:68, 1934) in parallel estimations on 24 normal subjects, found that the average difference in individuals ranged from 1·79°F. (0·99°C.) to 0·42°F. (0·23° C.) while in one case the rectal temperature was 3·5° F. (1·9° C.) higher, and in another was 1·7° F. (0·94° C.) lower than the oral reading; they quote the results of several similar investigations by other observers, who found variations ranging from 0° to 2·0°F. (1·11°C.). Renbourn and Bonsall (*loc. cit.*) have also observed that the oral temperature may very occasionally be higher than the rectal.

The question is by no means merely one of academic physiology. Physicians are not infrequently confronted with a patient complaining of indeterminate symptoms and presenting no abnormality on examination except a "persistent low-grade fever": sometimes a definite cause can be found, such as pulmonary tuberculosis, a chronic urinary infection, or, in the tropics, chronic malaria; in many cases, however, routine investigation proves entirely negative and the physician is faced with the question whether to spend further time and money on even more exhaustive bacteriological and radiological investigations, or, accepting the slight "fever" as within the normal limits for the temperature of that particular patient, to pursue a policy of masterly inactivity and vigorous reassurance. The subject has been discussed by Alvarez (*Gastroenterol.*, **5**:320, 1945) in a recent editorial. He points out that these patients are frequently tense, nervous women, and that such people tend to have body temperatures higher than those of ordinary quiet persons; frank psychological disturbances, too, may be associated with persistent or intermittent "fever," and Alvarez mentions two cases of persistent temperatures of 100°-101° F. (37·7·7°-38·3°C.) in women who had contracted unhappy marriages. Other cases of "psychogenic pyrexia" are quoted by Wolff and Wolff (*Arch. Int. Med.*, **70**:293, 1942) who also add a remarkable case of their own. According to Alvarez, there is a tendency in the United States to make a diagnosis of brucellosis in such patients, but in his opinion this is incorrect in most of the cases.

Any patient whose oral temperature rises every day to between 99° and 100° F. (37·20 and 37·7° C.) is clearly entitled to a search for all the usual varieties of chronic infection. If this proves negative, however, there seems little doubt that reassurance and encouragement to resume a normal life represent a wiser policy than prolongation of the period of invalidism by over-enthusiastic bacteriological investigation, and that this applies particularly in the case of "nervous" patients and in tropical or subtropical areas. The thermometer, like the sphygmomanometer, should assist but never replace clinical common sense.—*Brit. M. J.*, **1**:920, 1946.

Effects of Slow Starvation

Leyton (*Lancet*, **2**:73, 1946) writes that by combining previous reports with his own investigation, it is possible to present a moderately clear picture of the effects of chronic starvation and to correlate the clinical condition with some of the changes in the blood. Thus the main clinical features of starvation are, in order of their appearance, loss of feeling of well-being, rapid physical and mental fatigue, increased desire for sleep, and loss of memory for recent events. The next stage produces clinical signs of which the

most important are bouts of polyuria, decreased pulserate, lowered blood-pressure, lowered basal metabolic rate, and reduction in temperature. Oedema as a direct result of lack of food is a late sign. The change in the mental outlook is part of the syndrome and develops concomitantly with the physical changes.

There are constant changes in the blood. The first of these is usually a raised E.S.R., which is soon followed by a moderate progressive anaemia and a reduction in the plasma-protein level. There is a definite relation between the plasma-protein level and clinical oedema. The critical level varies from case to case but always lies between 5·3 and 4·6 per 100 c.cm. and is generally 4·8 gm per 100 c.cm. The change in the white blood corpuscles is a leucopenia with a tendency to eosinophilia.

The liability to the acute infections is not greatly increased by chronic starvation, but the incidence of tuberculosis among the half-starved is many times that found in well-nourished people.

The recovery from chronic starvation in the absence of organic disease or vitamin deficiencies is excellent and complete, provided the patient is not moribund before further rations become available.

Atom Bomb Disease

The two bombs dropped on Japan on Aug. 6 and 9, 1945 are estimated to have killed 120,000 people by blast, burning, or radio-active action. The blast effects seem to have differed only in degree from those of high explosive, though they were sufficient to destroy over 4 square miles of wooden houses at Hiroshima, and 1½ square miles of industrial and slum dwellings at Nagasaki. This widespread collapse of buildings caused most of the deaths. The radiant heat generated by the flash of the bombs was immensely greater than with other explosives. Travelling in straight lines, and therefore readily screened by intervening objects, including clothing, it produced severe burns within 1500 yards and less severe burns up to 2½ miles, though relatively few pepole were burnt to death. In their radioactive effects atom bombs differ from any lethal weapon which hsa gone before. The effects fo the blast and the heat were instantaneous, or at least were manifested within a few hours. The radiactive action, on the other hand, often left no immediate mark on its victims, but it nevertheless killed nearly everyone who survvied blsat and heat and was fully exposed within a radius of half a mile.

Of the various radioactive products of atomic fission, the radiations provisionally referred to as gamma rays (their exact nature is unknown) are the most lethal. These pass through the skin without affecting it, and the exposed person may have no symptoms for the first 24 hours. Thereafter he slowly develops the malady known to the Japanese as atom bomb disease, the main features of which closely resemble those of over-exposure to x-rays. Keller (*J.A.M.A.*, **131**:504, 1946) describes 21 cases admitted to Osaka University Hospital about the end of August, 1945, 5 of whom died in the fourth week after the bombing. Though half of them had been within 500 yards of a bomb, very few recalled feeling any blast, only 6 remembered a noise, and only 9 had seen a flash; but the fact that all but 2 were indoors may have accounted for this. The first symptoms to appear are anorexia, nausea, and vomiting, developing between the second and fifth days. Bloody diarrhoea with increasing anorexia and general malaise follow in the second week, when the hair on the scalp often begins to fall out. Thereafter the clinical picture is dominated by signs of failure of blood formation, for the gamma rays attack the bone-marrow and interfere with the replacement of red cells, granular leucocytes, and platelets. In the third week hæmorrhages appear, often accompanied by fever (98·6°-104° F). Of Keller's cases, 6 had bleeding gums, 3 subcutaneous ecchymoses, and others bleeding from the nose or throat; 4 of the 5 fatal cases had purpura. Other symptoms recorded include faintness, tightness in the chest, dizziness, difficulty in swallowing, and thirst; an increasing sense of weakness was almost invariable. One of the patients who died had a terminal jaundice, and another recovered after a transiet icterus. Laboratory studies in Keller's cases showed profound pathological changes in the blood. All the patients had a granulocytopenia, the total white-cell counts being below 1000 per c.mm. in 4 cases. The granulocytic series of cells were also strikingly depleted in 2 of the 5 patients whose marrow was examined. A hypochromic microcytic or normocytic anæmia was common though not constant, and thrombocyte counts were low. The sedimentation-rates were exceedingly rapid—usually over 100 mm. in the first hour (Westergreen)—and Keller maintains that this finding is of great diagnostic and prognostic significance. Bleeding-times were prolonged, the average being 13 minutes (Duke), but clotting-times were within normal limits. A positive indirect van den Bergh reaction was observed in 6 out of 7 patients; fragility fo the red cells was unaffected. The urine contained small amounts of albumin and sometime tyrosin, and an increased quantity of urobilinogen. The blood showed a profound fall in total proteins, especially albumin. The effects of the gamma rays on reproduction will not be fully known for some years. Pregnant women who were within 1¼ miles of the centre of the explosions have either miscarried or given birth to premature infants who died very soon. Two months after the bombings miscarriages and abortions still amounted to more than a quarter of all deliveries. A high proportion of the men exposed to gamma rays had reduced sperm-counts.

Thus though the main effect of the penetrating radiation is on the haemopoietic system and the liver, there is evidence of a more general disturbance which has yet to be fully elucidated More data will no doubt be available when the medical section of the joint commission publishes its promised report and when we know the results of the animal experiments of "Operation Crossroads".—*Lancet*, **2**:14, 1946.

Amphetamine (Benzedrine) Sulphate for Acute Barbiturate Poisoning

Freireich and Landsberg (*J.A.M.A.*, **131**:661, 1946) write that fourteen patients poisoned with barbiturates were treated with amphetamine sulphate injected intravenously. Thirteen patients recovered without any observable ill effects except for some headache. The patient who died had not received, in our estimation, a sufficient quantity of amphetamine sulphate because no more of the drug was available.

Experience with this small series of cases of poisoning with barbiturates is favourable enough to warrant further use of amphetamine sulphate for this type of therapy.

As soon as the patient was admitted treatment with intravenous injections of amphetamine sulphate was instituted. A preparation containing 10 mg. of amphetamine sulphate in 1 c.c.

of isotonic solution of sodium chloride was used. A complete examination was made of the pupillary reflexes, deep tendon reflexes, pulse rate, respiratory rate and blood pressure before the injection, and then the contents of one ampule (10 mg) were injected intravenously without dilution. Later it was found that larger doses could be used with safety and treatment injections of 40 mg. of the undiluted drug was started and continued with 20 mg. doses injected every thirty minutes. Observations of the blood pressure and pulse rate were made just before and after each injection. An immediate rise in blood pressure with an increase in the rate and fulness of the pulse were obtained in all cases. The pupils became dilated as result of the sympathomimetic action and remained so during the course of the treatment. Supportive treatment in the form of fluids given intravenously was used in some cases when dehydration was present. Except in case 11, in which the supply of amphetamine sulphate was exhausted, no other drug was employed.

Chemotherapeutics in Pneumococcal Meningitis

Smith and others (*Lancet*, **1**:185, 1946) write that thirty-eight cases of pneumococcal meningitis were treated with penicillin. Of these, 4 were moribund on admission. Of the 34 fully-treated cases 5 died—2 from meningitis, 2 from intracranial abscess (one with ventriculitis), and 1 from unrelated causes (fat-embolism). The last 18 fully-treated cases received both penicillin and sulphadiazine and all these patients recovered from their meningitis. In 27 cases recovery was complete.

The principles and practice of treatment are discussed. As a routine of treatment intrathecal and systemic penicillin, and sulphadiazine by mouth are recommended. It cannot be said that systemic penicillin alone can cure meningitis. Intrathecal treatment with penicillin carries certain risks, and the importance of strict asepsis is paramount.

Technical methods for preparing penicillin solutions and for penicillin estimation in cerebrospinal fluid are briefly described.

All 34 fully-treated cases responded promptly to intrathecal penicillin, but 12 subsequently relapsed, the number of relapses varying from one to eight. The causes of relapse are discussed, and the importance of maintaining an effective concentration of penicillin in the cerebrospinal fluid throughout the periods between injections is emphasised. In some patients penicillin disappears abnormally rapidly from the cerebrospinal fluid. In one such case this was caused by a subdural hydroma which acted as a leak in the leptomeninges.

It is important that regular assays of penicillin in the cerebrospinal fluid be done in order to provide a check on dosage and to detect any abnormal rate of excretion.

Consideration of the fatal cases shows that early diagnosis and prompt institution of treatment are the chief factors in prognosis.

Physiologic Use of Water and Constipation

McKenney (*Am. J. Digest, Dis.*, **13**:78, 1946) writes that some twenty years ago observation were begun in the clinics of the Oakland Health Centre, later in the Alameda Country Institutions' Clinics, to determine the relationship of water to constipation. Patients having constipation were instructed to discontinue the use of enemas, laxatives and cathartics and to take at least two or more glasses of water, either cold or hot, along with their meals, regardless of other fluids taken such as tea, coffee or soup. In obstinate cases they were advised to take an additional glass of water before breakfast. If there was no bowel movement for four or five days they were to take a single enema. All patients had to report at the clinic at least once a week. Of a total of 477 patients, 345 were taking water with their meals but took no laxatives or cathartics and had no constipation. Of these 345 patients 256 had been troubled with constipation and had taken various remedies for that condition. They became well on the discontinuance of medication when they included a sufficient quantity of water with their meals.

Paludrine in the Treatment of Malaria

Maegraith and others (*Brit. M. J.*, **1**:903, 1941) write that paludrine is a colourless slightly bitter drug belonging to a class of chemical compound not previously known to have antimalarial activity. Unlike most other antimalarial drugs, it has been found to have an action on the exo-erythrocytic forms of the parasites in *P. gallinaceum* avian malaria.

It has been used successfully in the treatment of benign tertian malaria (both in relapses and in delayed primary attacks) and in acute attacks of malignant tertian malaria (both primary cases and relapses).

It has a very wide therapeutic range of activity. Doses of 10 to 750 mg. and of 50 to 600 mg. twice daily for 14 days have been used successfully in the treatment of benign and malignant tertian malaria respectively. No serious toxic side-effects have been observed with such dosages, although occasional nausea and vomiting may occur at dosages of 500 mg. or more twice daily.

The administration of single doses of 50, 100, 200, 300 and 400 mg. will produce clinical cure of relapsing and delayed primary cases of benign tertian malaria. Similar effects have been obtained with single doses of 400 mg. mepacrine.

Twice-daily dosage regimes for 14 days have no greater effect on relapse rate of benign tertian malaria than full courses of mepacrine. The administration of one dose of 100 mg. weekly after treatment of the acute attack with a single dose of 50 to 400 mg. has so far been found to keep the patient free from relapses. The effect of this therapy over a period of six months is being investigated.

Thymine in Tropical Sprue

Spies and others (*Lancet*, **1**:883, 1946) write that a definite haematological response took place in each of 4 patients with the macrocytic hyperchromic anaemia of tropical sprue in relapse after the daily administration of 15 gm. of synthetic 5-methyl uracil (thymine) by mouth.

Reticulocytosis began on the fourth or fifth day of therapy, reached its peak on the eighth or ninth day, and was followed by an increase in erythrocytes and haemoglobin.

Clinical improvement was shown by an increase in appetite and strength, a disappearance of glossitis and burning and soreness of the tongue, and a return of the stools toward normal, as early as the fourth day of therapy in case 1. The stools did not become completely formed during the short period of initial observation. Over a much longer time they may become normal on the regimen of treatment, or it may be that the diet that was used was a contributory factor in the delay of the return of the stools to normal consistence. Certainly a diet such as was employed in this study for the treatment of tropical sprue is not to be recommended. On

the contrary, the patients are advised to eat a diet high in protein, minerals, and vitamins, and low in fat and carbohydrates.

These studies, along with previous observations, show that synthetic 5-methyl uracil is an effective hæmatopoietic substance for the macrocytic anaemias of both tropical sprue in relapse and pernicious anaemia in relapse. The haematological response effected by synthetic 5-methyl uracil, when given to patients with the macrocytic anaemia of tropical sprue in relapse, parallels that which follows the administration of synthetic folic acid. The clinical response, however, at this dose level is less dramatic than that observed with folic acid.

Criteria of Eosinophilia

Discombe (*Lancet*, **1**:195, 1946) writes that it is quicker and more accurate to determine the eosinophil count of blood in a haemocytometer, using a special diluting fluid, than to do a differential count using stained films.

Blood is diluted 1 in 20 with the fluid (1 per cent aqueous eosin Y and acetone 5 vols. each; distilled water to 100 vols.), which keeps some weeks, and after mixing allowed to stand 5 min. After the pipette has been shaken vigorously by hand for 2-3 min., a Fuchs-Rosenthal chamber is filled; and, when the cells have settled (1-2 min.), the preparation is examined with a $^{2}/_{3}$ in. objective and a X 10 eye-piece under the most brilliant illumination tolerable. Under these conditions unstained leucocytes cannot be seen at all, and the stained eosinophils appear as deep red particles and can easily be counted; in case of doubt one may examine indivdual cells with the $^{1}/_{6}$ in. objective. With this technique there can be no confusion between eosinophils and other cells, as was suggested by Galambos. Clumping is unusual; if it develops, the preparation must be rejected.

The normal range of eosinophils is 0-240 per c. mm. Not more than 1 per cent of normal subjects should have counts above this.

The method has proved invaluable; it is possible to demonstrate a mild degree of eosinophilia (400-500 per c.mm.) in most quiescent asthmatics, but its principal use has been in following the treatment of patients with injections of gold salts. Hulst has shown that toxic manifestations of chrysotherapy are associated with eosnophilia, and he recommended routine differential counts for its early detection. In a few personal cases without toxic manifestations no change in the eosinophil count could be detected; but in one case of dermatitis 1100 and in a case of stomatitis 8800 eosinophils per c.mm. were found; these counts returned to normal only after six or seven weeks.

Argemone Oil

Sen (*Indian M. Gaz.*, **81**:126, 1946) writes that argemone oil, obtained from the seeds of *Argemone mexicana* has been reported by several workers to be the causative agent of epidemic dropsy. The author describes and discusses in the following lines the special tests for argemone oil:

I. The nitric acid test—The colour reaction with nitric acid has been long recognised as a test for the pure oil (Leukowitsch), a deep red colour being imparted to the acid layer when equal quantities of the oil and acid are shaken together.

The technique of the test—Take about 5 mls. of the oil, add an equal quantity of the purest nitric acid free from nitrous fumes; shake so as to mix thoroughly the acid and oil layers; continue shaking for 1 minute; allow the layers to separate. Read the cloour of the acid layer as soon as this has occurred. In a positive reaction the acid layer acquires a colour. This is light yellow or yellow when small quantities of argemone oil, such as half to one per cent, are present, and of deeper shades, namely, deep yellow, orange to orange red as the quantity increases.

The nitric acid test is quickly performed and easily read. The three essentials for the test are: (*i*) a very pure nitric acid, and analytical reagent quality of a reliable maker being recommended, (*ii*) a quantity of acid equal to that of the oil, and (*iii*) thorough admixture of the two layers.

The test has fallacies, (*a*) yellow colour is also acquired by the acid layer when sesame oil is present, (*b*) a yellow to orange colour is produced when mustard oil has been coloured by an artificial colouring matter, (*c*) occasionally a yellow colour is obtained, not attributable to the above causes.

The report (Sarkar—*Ann. Bichem. & Exper. Med.*, **1**:271, 1941) that many other common adulterants of mustard oil, *e.g.* niger seed oil, safflower oil, cotton seed oil (not kapok oil), also give a colour with nitric acid may be due either to impure or very old samples being used for testing or the nitric acid used being not of proper quality.

Owing to the great importance which the test for argemone oil has acquired, the nitric acid reaction will retain its place as an easily performed, preliminary test for it, especially when many samples of mustard oil are being analysed in a laboratory.

II. The cupric acetate test (Lal *et al*—*Indian J. M. Research*, **27**:207,a1939).—An acidified solution of cupric acetate is known as the Barfoed's reagent; as it is much less readily reduced than an alkaline copper salt solution, it is used to differentiate the strongly reducing monosaccharides from the disaccharides. In the test for argemone oil, the cupric accetate solution is not acidified, the acid being added to the oil when carrying out the test. The details of this test as developed at the Bengal Public Health Laboratory are given below:

Reagents for the test—(*i*) A 3 per cent solution of cupric acetate, the cupric acetate being dissloved in distilled water by warming on a water bath. The solution is sky blue in colour without any trace of green in it. (*ii*) Glacial actic acid.

Technique of the test—Take 5 mls. of the suspected oil and 5 mls. of a known good oil in two test tubes; add 1 ml. of glacial acetic acid to each, shake thoroughly. The oil completely mixes with the acid. Add 2 mls. of the cupric acetate solution to each tube; shake and mix. place in a boiling water bath; shake frequently while in the water bath so that the layers do not separate out. After 15 minutes remove the tubes from the water bath altogether. Allow the layers to separate. Note the colour of the cupric acetate solution.

The colour of the copper solution is sky blue in the control tube. A greenish discoloration indicates a positive reaction. With fair quantities such as 10 per cent of argemone oil, which is seldom if ever found in adulterated samples, the colour becomes yellowish green. No precipitate due to the reduction of the copper solution is produced by this or by smaller quantities.

The cupric acetate test is a good confirmatory test for the presence of argemone oil. Carried out according to the above-stated instructions, it clearly detects 0·5 per cent of it.

III. The ferric chloride test—The following technique of the test, as found suitable by the writer, has been adapted from that described by Sarkar (*loc. cit.*)

Reagents—(*i*) Concentrated hydrochloric acid (pure).
(*ii*) Ferric chloride (fresh) .. 10 gm.
Concentrated hydrochloric acid .. 10 mls.
Distilled water .. .. 90 mls.

Take 2 mls. of the suspected oil, after filtering it free from any suspended impurities, in a test tube and 2 mls. of a good oil as a control. If the preliminary nitric acid test shows that the argemone oil present is small in quantity (say less than 1 per cent), take 4 mls. of concentrated HCl, shake and mix thoroughly. Warm in a boiling water bath for 4 to 5 minutes, shake again to mix thoroughly while in the water bath. Take out the tubes and add to each 1 ml. of the ferric chloride reagent. The reagent passes into the acid layer. Mix the reagent and the acid layer well by rotating the tubes between the palms of the two hands. This last step is very important. The tubes must not be shaken disturbing the separated acid and oil layers in order to mix up the reagent. Place the tubes in the boiling water bath and heat for 10 minutes.

A distinct precipitate appears in the course of heating even when 0·25 per cent of argemone oil is present. There is none in the control tube. The precipitate is in the form of characteristic reddish-brown masses floating in the acid layer; more commonly these gather at the acid and oil interface or rarely settle to the bottom. Under the microscope the appearance is even more characteristic, the masses are found to consist of clumps of light brownish-red acicular or needle-shaped crystals.

Mukherji (*Current Sci.*, **11**:279, 1942) writing about the ferric chloride test reported certain modifications. These were: (*i*) no addition of alcohol, (*ii*) the separation of the acid layer and its centrifugalization, and (*iii*) the addition of 4 to 5 drops of the ferric chloride reagent instead of 2 mls.

In the experience of the writer: (*i*) The addition of alcohol is not essential, in fact alcohol retards the formation of the precipitate making it appear more slowly. (*ii*) The separation of the acid layer does not make the test more sensitive. The procedure does not simplify the test. (*iii*) The quantity of the ferric chloride reagent can be reduced.

It should be noted (*a*) that the technique of the test as described by the writer is simpler than that of Sarkar, (*b*) that the precipitate appears during the process of the final heating for 10 minutes even when 0·25 per cent of argemone oil is present and it is in the form of characteristic clumps, and (*c*) that the precipitate which has been described by Sarkar as fibrous is really acicular or needle-shaped and is specific for argemone oil.

Aids to Diagnosis of Bronchial Carcinoma

Bronchial carcinoma is often difficult to recognise. The symptoms are variable and inconstant, particularly in the early stages, and radiology cannot do more than indicate the character and position of an abnormal shadow in the lung. Conclusive evidence can be obtained only by seeing the actual growth through a bronchoscope and obtaining a positive finding from a biopsy specimen. Unfortunately there are many occasions when the growth lies beyond the limit of bronchoscopic vision—for example, when it is situated in the upper lobe. Other aids to diagnosis are then required, and of these aspiration biopsy and examination for malignant cells in the bronchial secretions deserve consideration.

Aspiration biopsy is, on principle, to be condemned if there is any prospect of surgery being employed. The needle must traverse the pleural layers before entering the lung and suspected area of growth. If the pleural layers are adherent the danger to this cavity is removed but the chances of excision are reduced if the adherence is extensive and firm. Opinions differ on the value of examining the sputum for malignant cells, but there seems little doubt that it can be extremely useful in expert hands. The recognition of malignant cells has often established the early diagnosis which is essential if radical treatment is to be practicable. But the technique and identification of the cells found can only be undertaken by experienced and practised workers, and this probably accounts for the divergent views expressed on the method. Definite fragments of growth and dumps fo malignant cells are easily recognised, but isolated carcinoma cells can readily be confused with the epithelial elements which are to be found in any sputum. For this reason it is unwise to depend on a specimen taken within a fortnight of bronchoscopy, which by abrasion of the delicate mucosal surface may free microscopical quantities epithelial cells. In their modification of the sputum-cell examination method, Herbut and Clerf (*J.A.M.A.*, **130**:1006, 1946) combine bronchoscopy with direct aspiration of all secretions from the bronchi of the suspected area. The material is converted into smears while still wet and is fixed and stained; 5 slides are made and examined in detail. They claim that this bronchoscopical examination of the secretions gives more information than examination of the sputum for malignant cells and can be used as an adjunct to the routine bronchoscopy that would be made in any case of suspected pulmonary carcinoma. Their criticism of sputum-examination methods is based on quotations which are mainly drawn from the period before Dudgeon's publication.

More extensive use of both methods of investigation will undoubtedly provide an earlier diagnosis in cases where routine investigation has been inconclusive.—*Lancet*, **1**:860, 1946.

Ruptured Intervertebral Disk Simulating Angina Pectoris

Josey and Murphey (*J.A.M.A.*, **131**:581, 1946) write that precordial pain simulating that of coronary artery disease is frequently produced by a ruptured intervertebral disk in the lower cervical region. The differential diagnosis of these two conditions is of grave importantce to the patient and can be made on the basis of history, physical findings, electrocardiographic studies and x-ray studies of the cervical spine.

Seven patients with ruptured cervical disks with precordial pain as their presenting symptom were studied in detail. Three were operated on with relief of precordial pain and the other 4 were reassured with regard to their cardiac status and prognosis as to life expectancy.

The nerve pathway for the production of precordial pain by rupture of a lower cevical disk is not definitely known. This particular pain can be reproduced at operation and has been reproduced in 1 instance by pressure on the intervertebral disk itself.

Acute Haematogenous Osteomyelitis Treated with Penicillin

Agerholm and Trueta (Lancet, **1**:877, 1946) from the Department of Orthopœdic Society, Oxford, in reporting on thirty cases of acute osteomyelitis treated with penicillin in eighteen months write that blood-cluture was positive in 14 cases. Penicillin was first given systematically in a dose of 100,000 units in twenty-four hours. On theoretical grounds this dose was increased in later cases to a maximum of 400,000

units to obtain a concentration which should be bactericidal as well as bacteriostatic. When the infection appeared to be adequately controlled the dose was reduced to a minimum of 100,000 units in twenty-four hours.

Two well-defined groups of cases were distinguished: (1) those admitted before the bone was seriously damaged and before pus had formed; and (2) those admitted with an abscess already present.

Group 1 could be treated successfully by systemic penicillin alone, provided the course was sufficiently long and intensive; the condition might resolve without any radiographic bone changes; 7 out of 30 (1 in 4) cases admitted were suitable for this treatment surgically, as well as with penicillin, and surgery must include release of pus in the bone by drilling; after this, primary suture is safe and advisable to prevent secondary infection.

Cases in group 2 not treated by surgery as well as penicillin developed a spreading decalcification of the bone, the area of which increased over 1-5 months. Workers at other centres have confirmed this.

In this series there was no death, no joint involvement, and no secondary focus after admission. At the end of eighteen months 4 cases still have a sinus, but 2 of these are nearly healed; 28 cases have normal function; one patient admitted with septic arthritis of knee has limited range of movement; one has a sinus which keeps her in hospital.

The importance of surgical drainage in these cases is discussed.

One case of infection with a penicillin resistant organism was encountered early in this series. It is not included in the series, because at the time sufficient penicillin was not available for its adequate treatment. It was four times as resistant as the normal staphylococcus; it would have required at least 400,000 units of penicillin in twenty-four hours for bacteriostasis. The case serves as a reminder that the sensitivity of the organism must always be tested.

Surgery and Coarctation of the Aorta

A remarkable step forward in the surgery of the heart and great vessels has been the excision of the contracted aorta, with restoration of vascular continuity, by Clarence Crafoord, of Stockholm. With Nylin, Crafoord (*J. Thorac. Surg.*, **14**:347, 1945) recorded two successful cases, and at a lecture on Jan. 24 to the Society of Thoracic Surgeons he added five further cases, four of them successful.

There are some forms of aortic coarctation which clearly could not be considered for surgery, but the uncomplicated "adult" type in which the stenosis has become extreme may now be regarded as a potential case for radical treatment. The clinical picture depends on several effects of the srticture. Below the stricture the circulation is poor, and the femoral or popliteal pulse will be diminished; this may give rise to signs of intermittent claudication. Above the narrowing the aortic arch and great vessels are dilated, and the blood-pressure is much higher in the arms than in the legs. Hypertension is common and is probably due more to mechanical than to "essential renal" causes. The extensive collateral circulation developed round the coarctation produces large and tortuous intercostal and internal mammary vessels which may actually erode the ribs. Surface evidence of the anastomosis is usually obvious. With this unenviable future in store for patients with severe coarctation any attempt at surgical relief seems fully justified. The careful medical investigation of school-children in Sweden has been responsible for the recognition of cases which otherwise might have reached hospital only in the advanced stages; some of Craford's cases were originally diagnosed in this way.

Preliminary experiments demonstrated that the blood-supply to all organs could be occuluded for 20-25 minutes without damage so long as the cerebral circulation remained intact. This would allow sufficient time for resecting the stricture and restoring aortic continuity. On this basis the surgical treatment was devised and carried out, and what might seem to be the most formidable aspect of the operation—end-to-end suture of the aorta was satisfactorily effected by two or three stay sutures and a Carrel type of continuous silk suture. The approach to the mediastinum was made through the big left fifth-rib thoracotomy which Crafoord favours, and the aorta with the stricture and distended tortuous collaterals was dissected out. The enlarged and vigorously pulsating aorta just below the left subclavian was clamped and large collateral arteries temporarily secured, while below the stricture the narrow and relatively pulseless descending aorta was controlled. The narrowed area with the fibrous remnant of the ligamentum arteriosum was then exicsed. There was no difficulty in bringing the cut ends of the aorta together, and the suture was performed without any leaking, tension or narrowing. The functional results of the operation were in all respects satisfactory. Hypertension was reduced and the curculatory efficiency of the lower limbs was considerably increased. The subsequent progress of the patients has been carefully observed, and tonoscillography before and after operation has provided some interesting information. There has been no suggestion of thrombosis or disturbance at the site of operation, though a careful watch will have to be kept for any abnormality appearing in later years. The conception and execution of Crafoord's attack on what has hitherto seemed an unassailable problem must be regarded as an outstanding achievement which opens up further possibilities in the realm of active therapy—*Lancet*, **1**:203, 1946.

Tropical Ulcers and Penicillin

Webb (*Brit. M. J.*, **2**:49, 1946) writes that the tropical ulcers of South China appear to be a pathological entity caused by infection with B. *fusiformis*. Penicillin has a powerful therapeutic action on them, and, when the drug becomes more widely available for their early treatment, an immeasurable amount of suffering and disability will no doubt be saved.

Penicillin was given locally and by injection. In every case a solution of 500 units per ml. in distilled water or saline (both were effective) was applied on gauze to the cleaned ulcer twice a day. In addition, all except the mild cases received intramuscular injections of 15,000 units three-hourly up to a maximum of 90,000 units. Two cases were given an injection of 10,000 units into the tissues beneath the base of the ulcer. The milder cases, which had only external applications, cleared up as quickly as those having injections.

Treatment in the healing stage is similar to that of varicose ulcers, in that rest in bed considerably hastens the healing, and, apart from skin grafting, the best local treatment is to bind the ulcer in elastoplast, which can be changed after seven to ten days.

NOTES AND NEWS

INDIAN MEDICAL ASSOCIATION ON THE BHORE COMMITTEE REPORT

At the meeting of the Central Council of the Indian Medical Association held in Delhi on 20-10-46, the following conclusions were arrived at regarding the recommendations contained in the Report of the Health Survey and Development Committee:

The Committee places on record its appreciation of the very valuable work done by the members of the Bhore Committee. It has brought out vividly the conditions of Public Health and Medical Relief obtaining in this country in comparison to the standards prevalent in the progressive countries of the west. It has also recommended in a very apt way the work that will have to be put in to bring the health services and medical relief work in the country to a desirably efficient standard. In its survey, it has collected very valuable data which, though not complete in every respect, present a picture of the existing conditions, as precisely as could possibly be done within the time at its disposal.

While we are in general agreement with the aims and recommendations of the Bhore Committee, though in some cases we would have desired some more progressive recommendations, we shall be failing in our duty if we do not point out, in a constructive spirit, the drawbacks and possible disadvantages of some of these recommendations. It should be understood that any criticism which we propose to make, will be made in a spirit of helpful co-operation and with the sole object of achieving the results which both the members of the Committee and the Association have in view, in the shortest possible time and with the limited funds that are available, and which will be ultimately beneficial not only to the country but to the medical profession as well as for the benefit of medical science.

(1) From our calculation, it appears that the words "about Re. 1/-", mentioned in para 46 of chapter III of Vol. II of the Report, as the likely average annual cost of the personal health services, recommended by the Committee, per person, on the basis of a population of 375 millions, are an error. The per capita expenditure per annum is likely to be Rs. 12/- and not Re. 1/-. This will seriously affect the financial provision and the recommendations made may have to be radically altered in certain essential respects.

(2) It would not be possible nor desirable to give free medical service to all sections of the population without distinction. Free medical aid should be extended to the poor only, in both rural and urban areas, the rich being made to pay for the medical aid administered to them.

(3) For rural and sparsely-populated areas where doctors will have to do both preventive and curative work, it will be necessary to have whole-time salaried officers on adequate remuneration without the right of private practice, as otherwise suitable doctors in adequate numbers will not be forthcoming for work in such areas.

(4) For urban areas with a population of 10 thousand or over, which may be the centres of secondary units or district headquarters, domiciliary treatment should ordinarily be given by members of the independent medical profession. For the poor in such areas, however, the payment should be made by the State; the rich patients shall make direct payment to the doctor for services rendered.

In institutions and hospitals with 100 beds or more, the administrative, the resident and the preventive medical staff should be adequately paid whole-time salaried officers without the right of private practice. The senior staff and the specialists for the various departments in such hospitals should be engaged from amongst members of the independent medical profession, on a part-time or honorary basis.

It would be advisable not to attach Nursing Homes or paying wards to such hospitals. But if it is considered necessary or desirable to do so, rich patients, admitted to such nursing homes or paying wards, as also in the general wards of hospitals, should be charged fees according to scheduled rates and the amounts realised should be shared between the hospital funds and the Honorary or Part-time Medical Officers.

(5) *Long Terms & Short Term Plans*—It would be better not to have two different plans but to go ahead on the basis of long term plan in certain restricted areas commencing with primary units. It is feared that the short term attenuated plan is not likely to evoke much sympathy and response, as the quality of service that can be rendered under this scheme will be of a comparatively low standard. On the other hand, the qualities of work that can be done under the long-term plan will be of a much higher standard (though the area covered will be restricted) and it is likely that there would be greater enthusiasm amongst the people for such work and more funds may be made available for further extension of such centres in each district.

(6) *Professional Education*—We are not satisfied with the target of an annual output of 4000 to 4500 doctors. In view of the urgency of the situation and for the great leeway we have to make up, the target should be fixed at a much higher figure. This must be done, in addition to methods suggested for compulsorily upgrading and converting the existing institutions, official and non-official, and the creation of new colleges by introducing the double shift system in pre-clinical course, by utilising the existing laboratories, lecture halls etc. and by doubling the teaching staff. So far as clinical instruction is concerned, this can be done by appointing suitable teaching staff, and by utilising the hospital beds in the existing non-teaching institutions and the beds in new hospitals to be created.

The knowledge of the students and the efficiency of the graduates could be definitely increased, if their education and examination are conducted not only in English as at present, but both in their mother tongue and in English.

The following languages may be used for this purpose:— Hindusthani, Bengali, Hindi, Tamil, Telugu, Urdu, Marathi, Kanarese, Gujrati, Punjabi, Assamese, Sindhi etc.

It is realised that text books and literature used will have to be in English, at least, for years to come but explanation and answers may be given in the 'students' mother tongue or in both the languages (English and mother tongue), as the case may be. In view of the universities progressively adopting this course, there can be no possible objection to this suggestion being adopted in the case of medical education.

All-India Medical Institute

The Association is not in favour of one All-India Medical Institute to be established in Delhi. The purpose underlying idea of establishment of such an institute will be better and far more economically served by organising systematic post-graduate instruction in the medical colleges in each province under the auspices of the medical faculties of the universities.

(7) *Minimum Standard of Living*—It is considered necessary and desirable that the minimum requirements of a hygienic standard of living and living wages for various types of workers should be worked out and given effect to, as early as possible, and, if necessray by suitable legislative enactments.

(8) *Remuneration*—In the salary scales, as suggested for the short term programme, there is considerable discrimination between the Administrative and other medical officers. We are strongly of the opinion that such differences in remuneration can have no possible justification.

(9) *Indigenous Systems of Medicine*—The question of the Indigenous System of Medicine is such an important one that the council feel that the subject should be dealt, as an independent item at a subsequent session.

(10) In conclusion, it may not be out of place to reiterate the resolution passed at the All-India Medical Conference at Patna in 1943 which runs as follows:—

"That this Conference is of opinion that as each individual in this country has the right to obtain every type of medical service, preventive and curative, general and specialist, domiciliary and institutional, the State as well as various political parties in the country should devise ways and means to secure the same for him at an early dtae. This Conference also urges, upon the Indian Medical Association, which must play an essential part in the preparation of what is the most important charter of health ever conceived for this nation, to render every assistance in their power towards the evolution and fruition of such a scheme".

The Indian Medical Association will be glad to offer its full co-operation to the Government, Central and Provincial, in implementing the health service of the nation and will be very happy to send their representatives for consultation and deliberation in working out the details of the scheme, whenever and wherever necessary. The Association urges that in every Committee, Board and Council, (Central, Provincial & Local) the co-operation of the Association should be utilised by including its elected representatives as members of those bodies.

PRACTICAL FIELD WORK DOCTORS: EMPHASIS ON PREVENTIVE ASPECT OF MEDICINE

Addressing the members of the Delhi Medical Association recently on the Bhore Committee's recommendations regarding the medical profession, Dr. K. C. K. E. Raja, Officer on Special Duty, Health Department, emphasised the preventive aspect of medicine and the provision for direct insight into Social Medicine by contacts with home and community life.

The speaker pointed out that the Bhore Committee had stressed, in under-graduate training, the inclusion of methods "which would enable the student to learn for himself, think, observe and draw conclusions." This would be done by introducing clinical teaching in the pre-clinical period of training and by revising the syllabus for anatomy, physiology and other basic subjects so as to reduce the number of didactic lectures and increase the number of lecture-demonstrations. After the final examintaion at the end of the fourth year there is to be for every student one year's "internship", during which time he is to work under supervision and not given the full rights of a practitioner. At least three months of this period should be devoted to work in a public health unit.

As regards post-graduate education, Dr. Raja observed, the ultimate objective was for the country to become self-sufficient in the matter of training facilities although, during the early stages, it would be necessary to send students abroad for training.

Explaining the proposals regarding regulation of the medical profession, the lecturer said that the Committee had recommended the creation of an All-India Medical Register for registration of medical qualifications and for regulating the exercise of the profession.

In regard to employment of doctors in public services, it was pointed out that since the Committee aimed at the provision of adequate preventive care and treatment facilities to all members of the community, irrespective of their ability to pay for such services, in the State health organization the doctor should be paid adequately and prevented from private practice. This would ensure equal attention to the richer and poorer sections of the community.

MEASURES AGAINST YELLOW FEVER: NEW INDIAN AIRCRAFT (PUBLIC HEALTH) RULES

With the growth in civil aviation it has been found necessary to take stringent measures to prevent the introduction of yellow fever into India from the endemic areas, especially of Africa.

The Government of India have, from time to time, made amendments in the Indian Aircraft (Public Health) Rules, 1940, and have now issued the Indian Aircraft (Public Health) Rules, 1946, incorporating all these and certain other amendments.

Under the new Rules all aircraft coming from the West are required at present to land at Karachi. On arrival the aircraft and cargo may be disinsectised and all persons on board are to be medically examined either before disembarkation, or under such arrangements as may be made by the Airport Health Officer to reduce the risk of spread of infection to a minimum.

The new rules also make some changes in the period of validity of yellow fever inoculation certificates.

COLLEGE OF PHYSICIANS & SURGEONS, BOMBAY

The Council of the College of Physicians and Surgeons of Bombay at a Special Meeting held recently has decided that no students should be admitted for the L.C.P.S. Course into an affiliated Institution after December 1948.

* * * * *

The following candidates have passed the D.G.O. Examinations held in October, 1946:—

Ahmadjan, Hajra (Miss); Bhavnani, Jamni Uttamchand (Mrs.); Gogte, Eashadaya Trimbak (Mrs) and Nanda, Pushpa Gulzarilal (Miss).

The following candidates have passed the D.C.H. Examination held in October, 1946:—

De Sousa, Eustaquio Xavier; Kilimanoor Ravi Varma, Bhaskara Varma; Malik, Rasulmiyan Mohammedmiyan; Menezes, Olive (Miss); Moulvi, Kamartaj (Miss); Prabhu, Venkatesh Rama; Shenai, Laxmidas Subbanna; Sukhtankar, Kashinath Mahadeo and Tibrewala, Nandkishor Satyanarayan.

* * * * *

ROYAL COLLEGE OF SURGEONS OF ENGLAND

1. The Primary Examination in Anatomy (including normal histology) and Applied Physiology and the Principles of Pathology will be conducted at Madras.

2. The Examination will begin with the written paper on Monday, December 23rd, 1946.

3. Each candidate will be notified in writing of the result at the termination of the Examination.

4. The Examination is open to the following candidates (men or women) *viz.*:—

(*a*) Those possessing a qualification which is registrable in the British Medical Register; and

(*b*) Those possessing the degrees in medicine and surgery of a University recognised by the Council of the Royal College of Surgeons of England for the purpose.

Note I—The degrees of the following Universities in India are recognised for the Primary Examination: Andhra, Bombay, Calcutta, Lucknow, Madras, Patna, Punjab, Rangoon, Mysore and Osmania.

Note II—Unless a candidate's name appears in the British Medical Register a certificate from his University giving the date and description of his medical and surgical degrees must accompany the Form of Application.

5. Copies of the regulations, and of the Form of Application for admission to the Examination, may be obtained, free of charge, from the Director of Examinations, Royal College of Surgeons of England, Examination Hall, Queen Square, London, W.C. 1.

6. The fee for admission, or re-admission, to the Examination is £35 sterling, which must be sent with the Form of Application, so as to reach the Director of Examinations at his office (see clause 5 above) not later than Saturday, 28th September, 1946.

7. Candidates who withdraw from the Examination (owing to illness or any other cause) after their entries have been accepted will be refunded half the amount of the fee paid for admission to the Examination.

8. With the exceptions noted above, the examination will be conducted in accordance with the published regulations for the Fellowship of the Royal College of Surgeons of England.

UNQUALIFIED PRACTITIONER CONVICTED

The Registrar, Punjab Medical Council, Lahore writes:

The Additional District Magistrate, Lahore, has convicted Dilawar Hussain of Faiz Bagh, Lahore, an unqualified medical practitioner, under the Indian Medical Degrees Act and sentenced him to pay a fine of Rs. 52/-.

The accused unlawfully styled himself as "Qualified upto M.B.B.S., Registered Medical Practitioner."

PROGRESS IN RADIOLOGY

The first notice of the new discovery of X-rays in England in the lay press appeared in the London Standard of January 7, 1896, in an article headed "Photographic Discovery" and apparently contributed from Vienna.

It stated that a very important scientific discovery had recently been made by Professor Roentgen, of Wurzburg University. He had used the rays emitted from one of Crookes vacuum tubes, through which an electric current was passed to act upon an ordinary photographic plate.

The invisible ray, of the existence of which there was already ample evidence, showed the peculiarity that thin wood and various organic substances were transparent to it, whilst metals and bones were opaque to the action of the ray.

The article went on to state that there were photographs already in Vienna showing the bones of the hand. These opened up a wide field of speculation. It also mentioned some of the possible uses of the new photography, and concluded by assuring readers that there was no joke or humbug in the matter, and that it was a serious discovery by a serious German professor.

London Punch published some amusing illustrations about the discovery. One of these depicted a ghost-like figure with its head against the keyhole of a door which was also faintly outlined, and the drawing was captioned: "Interesting results obtained with the aid of Roentgen rays by a first floor lodger when photographing his sitting-room door."

Another entitled "A Study in Anatomy" showed a very thin horse with its ribs sticking out, and standing nearby, a horse-dealer with a prospective customer. The dealer, pointing to the horse is saying "That's what I call a picture". The prospective buyer, "Yes, he does rather suggest one of those Rœntgen ray photographs."

Important Advances—Announcement of x-ray discovery led to all sorts of reports, correct and fantastic, in the world's daily newspapers. Within a period of a few months, five works on the subject were published in America, and the new science rapidly developed as an aid to medical surgical practice.

From 1909 to the beginning of World War I, there was a great improvement in technique and apparatus, the most notable being the introduction of the Coolidge tube in 1913. Introduction of opaque meals afforded a great help in the diagnosis of gastro-intestinal disorders, and numerous papers appeared on the x-ray diagnosis of chronic appendicitis.

Since then, the most important advances have been the early diagnosis of pulmonary tuberculosis by the rays, the use of dyes for examination of the gall-bladder for gallstones, the gall-bladder function and the urinary tract, and for discovering congenital abnormalities and neoplasms.

A moderately recent advance has been the introduction of air into the spinal canal and in the ventricles of the brain for the diagnosis of brain tumours and other conditions.—Communication from Australian Public Relations Officer.

I.M.A. DISTRESS RELIEF FUND

The Hony. General Secretary of the Indian Medical Association gratefully acknowledges the following further donations to the I.M.A. Distress Relief Fund:

Anonymous Rs. 25/-; Karachi Medical Association (Sind Provincial Branch of I.M.A.) Rs. 550/; The Bellary Medical & Surgical Stores, Bellary Rs. 100/-; Jessore Branch I.M.A. Rs. 19/-.

CORRESPONDENCE

The Editor is not responsible for any views expressed by contributors

DETERMINATION OF SEX

Sir,—I am sure Dr. Bose's letter which appeared in the January 1946 number of your Journal must have interested most of your readers. They will certainly be interested in the following abstracts which I am sending you. In fairness, however, to Dr. C. C. Bose, I must admit that though the majority of the medical profession are quite ignorant of Unterberger's theory of sex-control, students of Biology have heard of it and practised it, and one of my friends—a professor of Biology—claims to have met with success in four or five cases. Mothers who had two or three daughters in succession have been able to get a son by following his technique!

The theory appears too facile and easy for one to accept it and we must remember that one swallow does not make one summer. The three abstracts given below as Appendices, moreover, afford sufficient grounds for scepticism! I am etc.,

Ranchhodlal Dispensary,
Ahmedabad — K. A. SHAH.
March, 1946

APPENDIX A—EXPERIMENTAL ATTEMPTS TO MODIFY THE SEX RATIO IN RABBITS AND PIGS

McPhee and Eaton (*J. Heredity*, **33**:429, 1942) write:

"The control of the sex determination mechanism is of such universal interest that reports of success are almost certain to be received with uncritical enthusiasm by a large audience. The basic reason for this in the human family is mainly one of sentiment which expresses itself in the desire for a daughter or a son at a particular time. Although the livestock breeder is motivated less by sentiment and more by financial gain, it is probable that his eagerness for a successful method of controlling sex is even greater. Thus a large section of the population is always eager to grab up a new sex control theory. It is unfortunate that of many hundreds of these theories propounded to date, hardly any have merit whatsoever and none has yet passed the crucial test of success in practice, in spite of lurid claims. Such procedures have only served to befuddle the public mind and to make for suspicion. In this way probably much more harm than good in advancing the cause of science has been done by enthusiastic sex-controllers."

"Warren (1940) summarized the results of attempts made by the Applied Research Laboratories, Dayton, New Jersey, and which had been sponsored and previously reported, as results became available, in the *New York Daily News*. This work was based on the theory that the acid alkaline balance of the vagina would have an effect on the spermatozoa, an acid condition resulting in a higher proportion of female offspring and an alkaline condition giving a preponderance of males. Rats were used and positive results were reported.... Results have now been reported from three institutions and the results are conflicting. Roberts (1940) used essentially the same technique as that used by Warren and his results indicated that douching female rats with lactic acid was effective in increasing the proportion of males. Cole *et al* (1940) conducted similar experiments with large numbers of rats and with a limited number of rabbits and the results were entirely negative.... Quisenberry and Chandiramani (1940) also reported a series of experiments similar to those described above in which both rats and rabbits were used. In their work with rats no significant departure from the control sex-ratio was obtained. With rabbits a significant alteration of the sex-ratio was obtained but the authors point out that the number of offspring was small and that the work was being continued."

"Following the publication of the conflicting results the Bureau of Animal Industry of the U.S. Department of Agriculture was requested to undertake some investigations to determine whether the sex ratio can be altered significantly either by douching the female with acid and alkaline solutions or by changing the pH of semen used for artificial insemination."

Summary and Conclusions—"Experiments on the value of acid and alkaline douche treatments in altering the sex ratio have been conducted with rabbits and swine. In all, 2,383 rabbits and 219 swine were born.

The results fail to show any significant modification of the normal sex ratio for the species as a result of the acid and alkali treatments.....

It is concluded that acid and alkaline douche treatments of the female and alteration of the pH of the semen are without effect on the sex ratio."

APPENDIX B—FERTILITY AND SEX RATIOS IN THE RABBIT

Casida and Murphree (*J. Heredity*, **33**:437, 1942) from the department of Genetics, University of Wisconsin write:

"Various studies on the acid-alkali method of sex-control have given inconsistent results when the chemicals have been introduced into the vagina prior to mating. This study has been focussed upon the effects of these chemicals when brought in direct contact with sperm *in vitro*.

Rabbit sperm have been treated with solutions of sodium bicarbonate and lactic acid and used in artificial insemination. No significant disturbance of the sex ratio of the offspring was produced by either of these treatment.

Additional trials with sodium bicarbonate in which tests were made of its effect upon the speed of travel and upon the survival of the male and female determining sperm failed to show any differential effects."

APPENDIX C—THE END OF BAKING SODA SEX CONTROL?

Cook (*J. Heredity*, **33**:449, 1942) writes:

"Way back in 1932, when we only had a depression to worry about Chapter II of the Unterberger Sex-control mystery burst upon a startled world. It all began at the International Genetics Congress held at Ithacanot in a Congress program, but in an interview held on the steps on benches of the Cornell campus. This "great discovery"—apparently new to American newsmen—captured considerably more newspaper space than all of the formal proceedings of the Congress combined. Postmen labored under a Christmas-like flurry of mail addressed to agencies such as the State Experiment Stations, the U. S. Department of Agriculture and the American Genetic Assoiciation, which might be expected to advise prospective parents just how to apply the baking soda to be sure of begetting little junior next time."

"Events in the bicarb industry have been chronicled from time to time in this *Journal*. We have commented before on the delightfully cockeyed but potentially dangerous experi-

mental technique developed by the *New York News* to save unterberger from oblivion. All this culminated in that remarkable book, "Animal Sex Control" by the *News*. Sex Control Editor, Carl Warren, reviewed in this *Journal* in June, 1940. As appeared from citations of glaring misstatements in the text, Editor Warren's knowledge of the simplest genetic concepts was titilating rather than exact. But this did not prevent him from stating that "the essential scientific question is answered. We have controlled the determination of sex in rats and rabbits." Reasons were given in that review for being very doubtful of this brash claim. And the editor of this *Journal* as much as said he would eat an entire issue of his own rather dry magazine if sex-controller Warren turned out to be right."

" . . . Gowen and Nelson have 'controlled the determination of sex' in Drosophila; but rats and rabbits, as well as people, will have to go on for the present in the old-time way. . . . ."

NEUTROPHILIA IN MALARIA

Sir,—We have recently come across a number of peculiar haemograms in cases of malaria. In some of these cases malaria parasites were found. In others, though no parasites were found, they proved to be malaria by clinical manifestations and quinine test.

In the literatures extant regarding malaria, monocytosis has been mentioned as a blood change. But in our cases neutrophilia was manifest. There was also moderate leucocytosis. About this, of course, mention is made in the contributions by the experts (Rogers and Megaw, Stitt and Manson). But about neutrophilia no mention is made anywhere.

In submitting this we are inviting other colleagues to pool their observations, analysis, experiences and conclusions to enable us to come to a really definite etiology of this queer phenomenon. For the present, we are giving our theory to fit the cases. But we are not dogmatic. We always welcome new light and more light.

Here are some haemograms:

1. Miss Knott 6-3-44
Poly 78%
Lympho .. 19%
Mono 2%
Eosino 1%
Parasite present B.T.Ring.

2. Mr. Hosler 27-3-44
Poly 76%
Lympho .. 13%
Mono 5%
Eosino 6%
Parasite present M.T.Ring.

3. Mr. H. P. Pal 15-5-44
Poly 79%
Lympho .. 18%
Mono 3%
Eosino .. .. nil
Parasite present M.T.Ring. *15-5-44.*

4. Mr. X C/o Dr. A. Raha.
Poly 75%
Lympho .. 22%
Mono 1%
Eosino 2%
Parasite not found. Patient recovered after quinine injection.

5. Dr. K. D. Pal 7-3-43
Poly 81%
Lympho .. 14%
Mono 3%
Eosino 2%
Parasite present M.T. Ring
Patient was suffering from slow fever and persistent hiccough.

6. Mrs. Sonone 19-12-45
Poly 80%
Lympho .. 18%
Mono 2%
Eosino .. .. nil
Parasite not found. Recovered after quinine injection.

7. Mrs. S. Basu 23-1-46
Poly 80%
No M.P. found. Cured with quinine by mouth.

8. Mr. Poddar 21-1-46
Cerebal type of fever. No M.P. found.
Poly 80%. W.B.C. 10,000
Cured by quinine injection.

9. Baby.
W.B.C. 10,000
Poly 82%
M.P. found.
Cured by quinine injection.

We ransacked our brain to understand this unorthodox blood picture. The only plausible thing that may produce this kind of blood change was hit after very careful searches into the causes of neutrophilic leucocytosis. On the face of it, the pictures look like coccal infections. But presence of malarial parasites and response to quinine set all doubts at rest. The chill, heat and somewhat sweat stages pointed to clinical malaria and demanded exhibition of quinine.

As to leucocytosis, we know three facts:

(1) Physiological conditions—Pregnancy and digestion. Of course, it must be conceded that there are two diurnal leucocytic tides, each of 12 hours' duration. The day-tide starts in the forenoon, reaches the acme in the afternoon, and ebbs during the evening. The night course starts in the evening, reaches the acme after midnight, and falls away in the morning. These tides occur independent of sleep, exercise, food and temperature. These show extreme lability of myeloid function. As the results of physical and mental exercises, the neutrophiles increase at the cost of the lymphocytes and eosinophils (Shaw, Goldberg and Lepskaid).

(2) *Infections*—Coccic infections lead to neutrophilia and bacillary infection to lymphocytosis (Price-Jones).

(3) Toxic conditions lead to neutrophilia (Piney). This theory matches our cases.

Malarial reaction on the reticulo-endothelium has been noticed in the stimulation of lymphopoiesis. Lymphocytosis is an indication of an infective lesion which has been overcome or is being held in check as in typhoid fever. But its giving place to neutrophilia is of bad omen as in typhoid fever as a type. In it when an acute inflammatory process occurs, *e.g.*, typhoid appendicitis, there is leucocytosis and the leucocytosis shows an increase in the polymorphs (Osler).

So far so good. But how to account for the unusual phenomenon—the neutrophilia in malaria?

Piney in his Recent Advances in Haematology says, "Increased functional demand can be a cause of lymphocytopenia." Its significance is bad.

We can think of a chain of events in our cases to find a link that demands of the bone-marrow the production of neutrophilic cells in preference to the other varieties. This peculiar activity of the parent tissue manifests itself in a reduction of intensity of lymphopoiesis below normal limits (Piney).

The malaria-infected R.B.C.'s ultimately burst and become dissolved in the blood. The freed merozoites and the laked R.B.C.'s act very much like the injection of some protein intravenously. But the reaction to it of the system does not cause

neutrophilia. On the other hand, it causes monocytosis. This has been observed by every malariologist of repute. Even in pyretic treatment of G.P.I. monocyctic rise has been noticed as a result.

Our explanation—The fever and the excessive haemoglobin content of blood lead to pronounced acidosis. The haemozoin pigments are repository of the toxin which produce pathological changes in the body. The liver becomes embarrassed to cope with so much effete matters. The hepatic capillaries, like those of the other viscera, are choked with infected R.B.C. The detoxicating function of the liver almost fails or fails very considerably. Quite probably there is sudden cloudy swelling of liver cells or onset of mild hepatitis. Thus the excessive toxaemia makes the increased functional demand as a cause of leucocytosis with neutrophilia.

The lymphocytic control of the infection snaps. W.B.C.'s rise to 10,000 or more (30,000 Manson), per c.mm. and the increased polymorphs stand as proof of it.

Therefore we consider increased toxaemia to be the main causative factor of neutrophilia in malaria. I am, etc.

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TRANSFUSION OF BLOOD IN ANCIENT INDIA

There is reliable evidence that transfusion of blood practised by modern surgeons was known to the physicians of ancient India.

The renowned poet Kshemendra born in Kashmere was the author of a great Sanskrit work in two parts of exceptional merit and beauty known as Bodhiswatta Avadan Kalpalata in which in numerous stories and legends of Bodhiswatta, the poet had given us the main doctrines and teachings of Gautama Buddha together with marvellous illustrations of the practical virtues of मैत्री (*maitri*), करुणा (*karuna*), मुदिता (*mudita*) and उपेक्षा (*upeksha*). In point of style, grace and poetic imagination, this great work of the poet of Kashmere presents a very near parallel to the works of Kalidas and other eminent poets of his age.

The poet Kshemendra flourished in Kashmere between the end of the 10th century and the beginning of the 11th century A.D. In the Rajtarangini, the epic history of Kashmere composed by poet Kalhan in the 12th century A.D. Kshemendra is mentioned as a very eminent poet and as an author of two very notable works *viz.*, the Bodhiswatta Avadan Kalpalata and Bharat Manjari besides another smaller work named the Charucharya Satak.

In course of time the Avadan Kalpalata became lost to India. Fortunately for the students of Buddhistic literature it found its way into Nepal and Tibet. Through investigations of the Asiatic Society of Bengal, the first part of the work was recovered from Nepal while the complete work of the poet was found and recovered from the Tibetan palace at Potal. The popularity of the work was evidenced from the fact that a translation of the book was made in Tibetan poetry with the help of an Indian scholar. The work being thus rescued from oblivion was published by the Asiatic Society of Bengal together with the Tibetan translation.

From the foreword to the book written by the poet's son Shomendra, himself a poet of no mean ability it appeared that the book was completed in 1035 A.D. in the 27th year of the reign of Maharaj Ananta Dev of Kashmere. The book as originally written by Kshemendra consisted of 107 *pallavs* or chapters to which an 108th chapter called the Jimutbahana was added by the poet's son Shomendra.

In the present article we are concerned with the 85th pallav or chapter of the book called the Hitaishi Abadan, or the story of the king who was most solicitous for the health and welfare of his subjects.

The story as related is that the capital of this king named Shibi was Sikhighosh (*i.e.*, the place were peacocks cooed) and that the great mission of his life was to find out the diseased and disabled among his subjects and to restore them to health by putting them under treatment by eminent physicians. Once upon a time it came to the king's knowledge that a certain subject of his was suffering from an obstinate and incurable ailment and that his life was despaired of. The king took over charge of the sick person and summoned a council of the most eminent physicians in his kingdom, who, after a prolonged investigation of the patient's condition, gave their opinion that the patient in question suffered from an incurable illness for which the only remedy was transfusion of blood from the body of another person into the patient's body. The modern process of grouping or banking of blood were certainly not known so that the physicians in their own way gave the direction that the donor of blood should be a person who had never been subject to any kind of passion in his life. We could not be sure whether this was due to the belief that freedom from passion ensured the purity of blood. Be that what it may, this made the king very uneasy as the physician's direction might be an impossible one but on further reflection it was argued by the king that he himself could give his blood since from his childhood up he had never yielded to passion because of his mother's vow to avoid passions of all kind from the very moment of her conception. Thus resolved, the king's own blood was transfused into the patient notwithstanding the protest of his dependents that it might risk his own life. The blood being transfused the patient made a rapid progress and in six months was restored to normal health when after salutation to the king he left the king's palace.

A doubt might arise here that in view of the omission in the story regarding the process followed evidence was lacking as to whether it was a case of transfusion of blood or an internal administration of blood in view of its hæmoglobin content. Evidently, the poet's object was to pay a tribute to the king who careless of his own life saved that of his subject. It seems thus that no inference could be drawn that it was not a case of transfusion of blood. On the other hand it is indisputable that in ancient India, a marvellous progress had been made in surgery and we find from the Sushruta that mention is made of various surgical instruments as well as operations including amputation of limbs, and abdominal caesarian section, removal of cataract, dissection of dead bodies in the course of surgical training, sterilization of wounds by fumigation etc. In the 3rd or 4th century B.C. there were hospitals for animals so progress had been made also in veterinary surgery. There is thus no sufficient reason for doubt that the ancients who knew and practised all these were ignorant of the process of transfusion of blood.

Calcutta,
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